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To serve as an advocate and resource for the practice of Orthopaedic Physical Therapy by fostering quality patient/client care and promoting professional growth.

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Keeping Informed: Bytes or Paper?

As Editor, many decisions need to be made. One decision that has varied implications is that of changing the method of delivery of *Orthopaedic Physical Therapy Practice* (OP). As many of you may know, various publications have recently begun to offer online only access to its publications in response to improvements in technology and in an attempt to meet the needs of its subscribers and also curtail printing and production costs.

Unfortunately such a decision is not an easy one for OP. Currently our total budgeted cost of printing OP was $48,000 in 2007. Mailing costs are projected to cost $21,000. Ad revenue, although on the increase, does not fully cover total costs of publication.

As is common to many publications, we rely on selling ads to offset such costs but still view the content of OP as being the bread and butter of filling a niche between peer-reviewed publications and other interest reviewed publications like OP. Even though it intuitively seems like a cost saver to go online only, one has to consider how much of an impact such a change in delivery would have on advertisers. In addition it's important to know how OP is read by our readers. Even with online access, there is something about receiving a hard copy--being able to physically get the effect of its flavor in a hard cover bound edition. We were sensitive to this issue when we made a cover change. We wanted a design that was dynamic and made readers want to look inside.

Our web coordinator, Tara Fredrickson, has already done an excellent job revamping our portion of the website. If you haven't seen the OP webpage, please preview it. Currently many readers can still view the online version in its natural color and format, but I am not sure how many readers would need or want to print the editions on a color inkjet or color laser printer. Also if we went totally online only, I would foresee a change in formatting to not just replicate what is in print but to modify the issues to have more definitive identifiers. Plus, we would certainly need to consider more additions to our search engine for the archive.

Ultimately the decision to go completely digital, will be driven by you--the reader. We want to make sure that even though going to an online version seems cost effective, is this what readers really want or are we assuming too much? How will it impact the value of OP as a membership benefit. These are only questions each of you can answer. So we are asking you to take a few minutes to tell us what you want on this issue. My results will be presented to the Orthopaedic Section Board at CSM in Nashville. Briefly the Editors at OP have come up with a pro/con list (see below). Also we could easily send out an email blast table of contents with links directly to the members only login of the Orthopaedic Section website to allow the reader quick access to the articles directly. Of course this method of communication is dependent on having an updated email address from you and also to allow the blast to make it through any spam filter you have set. We are anxious to hear any feedback you have. Please fill out our very brief survey on the Orthopaedic Section website. You can find it at orthopt.org/pt_survey.php.

PROS FOR ONLINE

- Section goes green, could possibly result in cost reduction (if enough people opt out)
- Option to read online and print what you like
- Leads to website access for other news and information in Ortho Section
- Personal archive of articles you want on your computer
- Active links can be embedded in articles if internet references are used, may also request author correspondence

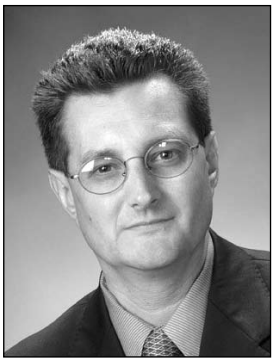
CONS—(PRO FOR PRINT ONLY)

- Print version is readily available to pick up and read at your leisure or on the go
- Advertisers may not see as effective as print media
- Need to make sure we have your current email address to communicate when it goes online if only digital format
- If website goes down, then no access and internet access dependent on member login

Whatever your needs, rest assured that the staff at *OP* will continue to do their best at serving the members. Best wishes to you as we approach the holiday season.

president's corner

James Irrgang, PT, PhD, ATC
President, Orthopaedic Section, APTA, Inc.



I hope you have taken some time to enjoy the changing of the seasons. And for those of you who are college football fans, I hope your team has faired much better than my favorite team this year! This year our slogan is "never let a bad game ruin a good party." To that end, I "forced" the Orthopaedic Section Board of Directors (BoD) sit through a wet, 45 degree, rainy, windy home team loss to kick off the Fall BoD Meeting in Pittsburgh in October. Despite the outcome and game conditions, I am happy to report that we had a very successful and productive Fall BoD meeting.

The Fall BoD meeting was highlighted by the attendance of John Barnes, who is the new Chief Executive Officer for APTA. John was on hand to describe the recent reorganization at APTA headquarters as well as outline his short-term plan that includes a critical analysis and review of each Unit and Department within the Association, development of a comprehensive strategic plan, and a review of the organization's governance structure. John is committed to enhancing the "brand" of physical therapy and to creating an organization that is nimble to react and respond to the profession's challenges of today and tomorrow. John also expressed his commitment to work collaboratively with our Section whenever opportunities arise.

The focus of the Fall BoD meeting was to review and implement the Section's Strategic Plan that was approved this past April (see OPTP, Vol. 19, No.2, 2007). Joe Godges, Treasurer, presented a balanced budget for 2008 that provided the financial resources needed to support the Strategic Plan. A summary of the progress that the Section has made with regards to the Strategic Plan will be presented and available for review at the Section Business Meeting at the Combined Sections Meeting in Nashville this upcoming February. Below I would like to review some of the highlights from the Fall BoD Meeting.

RESEARCH

The Orthopaedic Section has a long history of supporting research that enhances the practice of orthopaedic physical therapists. In the past this has included support for the Section's small grants program as well as substantial support for the Foundation for Physical Therapy, that most recently included a gift of $350,000 to support the Clinical Research Network. The Section's support of research has had a substantial impact on physical therapists' ability to manage patients/clients with a variety of musculoskeletal conditions.

The intent of the Section's small grants program is to provide support for studies that systematically examine orthopaedic physical therapy issues and to address the urgent need for clinical research in orthopaedic physical therapy. This grant program is designed to provide funding to any Orthopaedic Section member who has the clinical resources to examine a well-defined clinical practice issue, but who needs some external funding to facilitate completion of the clinical research project. A listing of recipients of the Section's small grants awards can be found at http://www.orthopt.org/prev_grants.php. Many of these studies have lead to publications that have impacted the practice of orthopaedic physical therapy.

This past summer, the Orthopaedic Section convened a Task Force that was chaired by Lori Michener to evaluate the Section's small grants program. There was overwhelming support for the small grants program and based upon a recommendation from the Task Force, the Section has expanded funding for small grants from a total of $30,000 per year to $75,000 per year and increased the maximum amount for an individual award from $10,000 to $25,000. Revised guidelines for the Section's small grant program can be found at: http://www.orthopt.org/downloads/grants.pdf. Section members are encouraged to review the guidelines and apply for funding to support their research interests and needs.

At the beginning of this year, the Section fulfilled its financial commitment to the Foundation for Physical Therapy for support of the Clinical Research Network that was awarded to the University of Southern California. By all accounts the CRN was hugely successful and provided mentored clinical research training opportunities and numerous presentations and peer-reviewed publications. A recent summary of the Clinical Research Network can be found on the Foundation's website. Given the success of the Foundation to support research that is important to the practice of orthopaedic physical therapists, the Orthopaedic Section BoD voted to contribute $500,000 over the next 7 years to establish an endowment fund that will support high impact research that is directly related to orthopaedic physical therapy practice. The BoD believes that it is important to continue to take a leadership position in supporting the Foundation. By doing so, the Foundation will be able to leverage other gifts to support the Orthopaedic Physical Therapy Research Endowment.

ICF-BASED PRACTICE GUIDELINES FOR COMMON MUSCULOSKELETAL CONDITIONS

Last year the Orthopaedic Section announced an initiative to develop evidence-based practice guidelines that are based on the International Classification of Function and Disability. These guidelines address examination, evaluation, diagnosis, prognosis, intervention, and assessment of outcome for the most common musculoskeletal conditions treated by orthopaedic physical therapists. It is believed that these guidelines will advance orthopaedic physical therapist practice and could be used to guide professional and post-professional education and to establish an agenda for future clinical research.

At the Fall BoD Meeting, the first set of practice guidelines for examination and treatment of heel pain and plantar fasciitis

were reviewed and approved. These guidelines were developed by the Foot and Ankle Work Group that was lead by Thomas McPoil. Prior to review and approval by the Orthopaedic Section BoD, the guidelines were reviewed by consultants from professional education programs and orthopaedic and sports physical therapy residency programs as well as by practicing clinicians and experts in claims review, coding, epidemiology, and medical practice guidelines. After approval by the Orthopaedic Section BoD, the guidelines were submitted for review and publication in the *Journal of Orthopaedic and Sports Physical Therapy*. Practice guidelines for common musculoskeletal conditions including ankle sprains, Achilles tendonosis, hip osteoarthritis, hip fractures, low back pain, frozen shoulder, and rotator cuff tears/impingement are currently in development. An update concerning this project will be provided at the Combined Sections Meeting on Friday, February 8th, 2008 from 8 – 10:00 AM.

To facilitate the future development and review of these practice guidelines, the BoD established a position for Coordinator of ICF-Based Practice Guidelines. Additionally, an Advisory Panel will be established to review, edit, and approve the guidelines. It is expected that 3 to 4 practice guidelines will be developed per year over the next 3 to 4 years. Overall we expect a total of 20 to 25 practice guidelines to be established. These guidelines will be reviewed and updated on a 5-year cycle.

CLINICAL RESIDENCY TRAINING MATERIALS

The growth of clinical residency programs for orthopaedic physical therapy is important for the future of the profession and the Section. By 2020, it is expected that completion of a residency will be the norm for new professionals and will be the pathway to specialization in orthopaedic physical therapy. To date however, the number of orthopaedic residency programs is relatively small and inadequate to meet the expected future demand for residency training. In part this is because potential residency sites believe that they do not have the expertise necessary to provide the didactic and psychomotor training components that are essential for a clinical residency program.

To address this problem, the Section has established an initiative to develop and disseminate educational materials and programs to support clinical residency programs. The *Description of Specialty Practice in Orthopaedic Physical Therapy* will be used to develop a standardized curriculum that could be adopted in whole or in part by new or established clinical residency programs. The curriculum will be used to guide the development of educational modules. These modules will include existing and planned Independent Study Courses as well as modules that are developed specifically to support residency education. On-line methods to deliver the didactic educational materials will be explored. The Section will also investigate the need for regional programs that would offer intensive hands-on training to develop the psychomotor skills that are necessary for an orthopaedic physical therapist.

The educational materials and programs will be offered as a cafeteria-style plan that would be available for any facility wanting to offer an orthopaedic clinical residency. New residency programs may want to use all of the modules, while established residencies may choose those modules that would enhance their program.

It is expected that the clinical training and mentoring as well as assessment of clinical competency that is essential for a clinical residency program will be offered by the residency program. To facilitate the development and training of qualified clinical faculty, the Section will also offer programming to train and develop clinical faculty.

To facilitate the development of these educational materials to support clinical residency programs, the Orthopaedic Section BoD voted to approve the creation of a position for Coordinator of Clinical Residency Training Materials. Additionally, an Advisory Panel will be developed to support this initiative. It is believed that the development of these educational materials and programming will promote the further development of orthopaedic physical therapy residency programs, which is critical to the future development of our specialty area.

COMBINED SECTIONS MEETING

I would like to encourage all Section members to attend the Combined Sections Meeting that will be held in Nashville, Tennessee, February 6th – 9th, 2008. Beth Jones and the Education Committee have developed a great educational program that includes programming on evaluation and treatment of cervicothoracic pain; differential diagnosis of the lumbar spine, hip, and pelvis; and evidence-based prevention and treatment of lower extremity stress fractures. Additionally, the Animal Rehabilitation, Performing Arts, Occupational Health, Foot and Ankle, and Pain Management special interest groups will offer programming.

To encourage greater participation in the Business Meeting and attendance at the Awards Ceremony and Rose Award Celebration, we have changed the format and day for these activities. These activities will now be held on Friday February 8, 2008 as follows:

4:00 PM	Rose Excellence in Research Award Presentation
5:00 PM	Business Meeting and Reception
7:00 PM	Awards Ceremony – presentation of the James A. Gould Excellence in Teaching, Outstanding PT and PTA Student, Bowling-Erhard Clinical Practice, and Paris Distinguished Service Awards
8:00 PM	Rose Award Ceremony

Hors d'oeuvres and limited drinks will be served prior to the Business Meeting with dessert and entertainment provided at the Rose Award Ceremony. Please mark your calendar to attend these Section activities. We hope to see all Orthopaedic Section members and friends there.

In closing, I would like to wish all of you a Merry Christmas and a safe and healthy New Year. I look forward to seeing you at the Combined Sections Meeting. As always, feel free to contact me with any questions or concerns that you may have or if you want to become more involved in Section activities.

Surgical Techniques and Postoperative Rehabilitation for Isolated Posterior Cruciate Ligament Injuries

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ABSTRACT

Background: This is the third paper in a 3-part series on isolated posterior cruciate ligament (PCL) injuries. Part 1 reviewed the anatomy, biomechanics, mechanisms of injury, physical examination, and differential diagnosis of PCL injuries. Part 2 reviewed the natural history and rehabilitation principles for individuals with PCL injuries. **Purpose:** As the third paper in a 3-part series on isolated posterior cruciate ligament (PCL) injuries, this paper will review indications, technical considerations, and postoperative rehabilitation principles in the surgical treatment of isolated PCL injuries. **Methods:** Current literature pertaining to indications, technical considerations, and postoperative rehabilitation principles in the surgical treatment of isolated PCL injuries was reviewed. **Clinical Relevance:** This paper reports current findings related to the surgical treatment and postoperative rehabilitation of isolated PCL injuries, which remains a topic of debate for orthopaedic surgeons and physical therapists.

Key Words: isolated posterior cruciate ligament injuries, surgical treatment, postoperative rehabilitation

INTRODUCTION

Surgical treatment of isolated PCL injuries is an area of continued controversy. A variety of graft designs and reconstruction techniques exist. There is no clear consensus among orthopaedic surgeons as to which techniques or graft designs are best. Outcomes between the various surgical treatments are difficult to compare due to the wide range of injury patterns, differences in research testing protocols, graft selection, operative technique, and rehabilitation programs. The purpose of this paper is to review indications, technical considerations, and postoperative rehabilitation principles in the surgical treatment of isolated PCL injuries.

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SURGICAL INDICATIONS

While indications for PCL reconstruction in a multiligament deficient knee have been well defined, the indications for isolated PCL injury are less clear. As the outcomes of nonoperative management are good or excellent in 50% to 80% of patients with isolated grade I or II PCL injuries, most surgeons initially recommend rehabilitation as outlined in Part 2 of this series.[1-3]

However, not all patients with isolated PCL injuries have good outcomes.[4,5] Multiple authors have demonstrated degenerative changes occurring in the medial and patellofemoral compartments of chronically PCL deficient knees (Figure 1).[3,4,6,7] As reviewed in Part 2 of this series, there is no reliable method to predict which patients will have deteriorating knee function with nonoperative management.[1,3] The PCL injuries sustained in high energy trauma, such as motor vehicle accidents, are associated with poorer outcomes in comparison to injuries which occur during athletic activities.[6]

Figure 1. Radiograph demonstrating medial compartment arthritis in an individual with a chronically PCL deficient knee.

Some surgeons have advocated PCL reconstruction when side-to-side differences in posterior translation exceed 8 mm to 10 mm.[8,9] Translation of this quantity however suggests a combined (Grade III) and not isolated injury.[10,11] The only clear indication for surgery in patients with isolated tears of the PCL are those who remain symptomatic despite appropriate nonoperative intervention. Chronic pain, not instability, is frequently the chief complaint of these patients. Pain may be present with or without arthrosis in the medial tibiofemoral or patellofemoral compartments.[12] Instability, if present, has been reported to occur when ascending or descending stairs.[4,12] Outcomes following PCL reconstruction suggest substantial decreases in pain, sometimes with only moderate improvements in static stability.[13,14]

TECHNICAL CONSIDERATIONS

Many types of grafts have been used for PCL reconstruction. Graft choice depends on balancing multiple factors, including graft availability, patient preference, surgeon preference, and planned reconstruction technique. The surgeon should be familiar with several options depending on the situation.

As with any ligament reconstruction, the optimal graft material remains controversial. Clinical outcomes comparing allograft versus autograft for PCL reconstruction using a tibial inlay technique suggest there is no difference in stability using objective or subjective International Knee

Documentation Committee (IKDC) scores at a minimum 2 years follow-up.[14]

Advantages of allograft include lack of donor site morbidity, shorter operative time, and availability of various sizes and shapes of potential graft material. Specifically related to PCL reconstruction, the availability of various sizes and shapes of graft material allows for multiple graft designs and fixation methods (Figure 2). Commonly used allografts for PCL reconstruction include Achilles tendon, bone-patellar tendon-bone, and the anterior tibialis tendon.

Our preference is to use a bifid bone-patellar tendon-bone allograft which is fashioned into a 12-mm to 13-mm wide tibial bone plug that widens to a broader 11-mm anterolateral bundle and a 9-mm posteromedial bundle on the femoral side.[15,16] This graft most closely approximates the normal anatomy of the PCL, including restoration of the native PCL "twist." Another advantage is the presence of bony fixation on all three ends of the graft, thus allowing rigid fixation and bone-to-bone healing and immediate motion postoperatively.

The primary disadvantages of an allograft include the risk of disease transmission and slower graft incorporation.[17-19] Despite careful screening and processing, allograft tissue has the potential of transmitting bloodborne diseases, such as hepatitis, human immunodeficiency virus, and bacterial infection.[20] Jackson et al studied the mechanical and histologic properties of allografts and autografts in a goat model.[21] Six months following reconstruction, the allografts had increased translation and decreased maximum force to failure compared to autografts. The allografts also had smaller cross-sectional area with persistence of large diameter collagen fibrils indicating slower remodeling. These basic, biological differences influence the clinical postoperative course. Rehabilitation following PCL reconstruction with an allograft is more conservative when compared to the rehabilitation program following autograft reconstruction. Specifically, the program is delayed to allow additional time for greater maturation which improves the final strength of the allograft.

Autografts are beneficial because there is no risk of disease transmission and no delay in graft incorporation. The primary disadvantage of autograft is donor site morbidity. Complaints involving the harvest site such as pain, weakness, fracture, or tendon rupture have been well documented.[22] Another limitation of autograft reconstruction can occur when multiple ligaments are injured necessitating multiple donor sites. Harvesting from the contralateral side is possible, but the patient may be reluctant to have an operation on the uninjured side.

The single bundle PCL technique was developed to anatomically recreate the anterolateral bundle. Following the single bundle technique, patients have improved stability and strength with a satisfactory function recovery.[13] However, advocates of the double bundle method note its biomechanical superiority in restoring normal knee function throughout the range of knee flexion when compared to a single bundle method.[23-26] Although double bundle reconstruction is more technically challenging, intermediate-term clinical outcomes support double bundle reconstruction.[27,28] Long-term prospective clinical studies are needed to further compare single and double methods.

Reconstruction Techniques

Numerous surgical techniques are currently used for PCL reconstruction, with the goal of reproducing the normal anatomy of the PCL. Controversy exists over the ideal method of tibial fixation. Published techniques include transtibial tunnel, open tibial inlay, and arthroscopic tibial inlay. The major advantages and disadvantages of these PCL reconstruction techniques are summarized in Table 1.

The transtibial tunnel is a widely accepted technique for PCL reconstruction which can be performed through an all-arthroscopic approach. Advantages of this technique include easier patient positioning, lower morbidity, and reliable clinical results.[29] However, a recent cadaveric study demonstrated that the guidewire used for placement of the transtibial tunnel may place the popliteal artery at increased risk compared to the open inlay (Figure 3).[30]

The major concern regarding the transtibial method is the acute angle the graft takes as it exits the tibial tunnel and passes over the posterior aspect of the tibial plateau, the so called "killer turn."[31] Some biomechanical studies suggest this places abnormal stresses on the graft, resulting in graft lengthening and possible failure with cyclic loading. In 2001, Bergfeld et al reported increased posterior translation and increased graft thinning with repetitive loading of PCL grafts placed via a transtibial tunnel versus a tibial inlay technique.[32] These findings were supported by Markolf et al, who also compared the two methods and demonstrated graft thinning and permanent graft elongation with cyclic loading of the PCL after reconstruction using the transtibial tunnel technique.[33] There was also rupture of 10/31 (32%) grafts at the posterior aspect of the tibia prior to completion of the cyclic testing.

The open tibial inlay technique allows a direct approach to the tibial attachment of the PCL. This open technique, which also incorporates arthroscopy, was developed to avoid the "killer turn."[31] Another advantage of tibial inlay is that it is a more anatomic recreation of the wide PCL insertion on the tibia. Morbidity of the open posterior approach to the knee is the main disadvantage of this technique. Traditionally, the open posterior approach has been performed with the patient in a prone or lateral decubitus position. These positions make the arthroscopic portion of the surgery challenging. However, Sekiya et al have described a technique that uses a posteromedial approach with the patient positioned supine with a bump under the contralateral hip (Figure 4).[15] This technique allows for an

Figure 2. Examples of an Achilles tendon and bone-patellar-bone PCL allografts.

Table 1. Summary of Advantages and Disadvantages of PCL Reconstruction Techniques

	Advantages	Disadvantages
Transtibial Tunnel	Lower morbidity	Killer turn Risk of neurovascular injury
Open Tibial Inlay	Avoids killer turn Biomechanical advantage	Posterior approach Patient positioning
Arthroscopic Tibial Inlay	Avoids killer turn Avoids posterior approach Benefits of both transtibial and open tibial inlay	Technically challenging

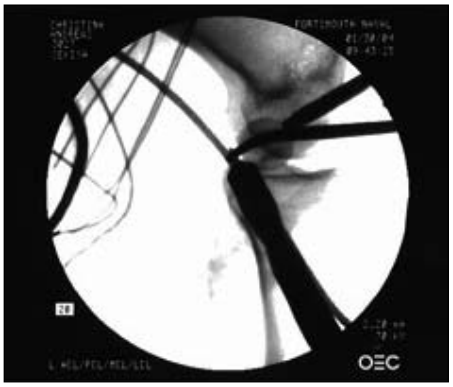

Figure 3. Relationship of guide wire and popliteal artery with transtibial tunnel approach.

easier transition between the open and arthroscopic portions of the surgery.

Although cadaveric studies cited above suggest biomechanical advantages with open tibial inlay, subsequent research comparing transtibial and open tibial inlay methods have demonstrated no significant differences.[34-36] Clinical studies have also demonstrated no subjective or objective difference between transtibial and open tibial inlay methods at short term follow-up.[29,37]

The arthroscopic tibial inlay technique was developed to provide the biomechanical advantages of the tibial inlay but avoid the potential complications of the traditional open technique.[38,39] This is a technically challenging method requiring the surgeon to be proficient in arthroscopy of the posterior knee compartments. Biomechanical testing demonstrated the arthroscopic tibial inlay with suture fixation of the graft had similar fixation strength when compared to open tibial inlay with screw fixation.[40] To date, clinical studies report promising results with arthroscopic tibial inlay, but longer term prospective trials are required to confirm the efficacy of this technique.[38,39] Recently the arthroscopic tibial inlay has been described in conjunction with the use of a bifid bone-patellar tendon-bone allograft (Figure 5). This technique may avoid the morbidity of an open approach while preserving the biomechanical advantages of the inlay technique.[39]

Figure 4. Posteromedial approach for the open inlay technique for PCL reconstruction.

Figure 5. Arthroscopic tibial inlay technique for PCL reconstruction.

Postoperative Rehabilitation Principles

Our general rehabilitation guidelines assume 8 weeks are necessary to allow for graft to bone healing with supervised rehabilitation continuing for 3 to 5 months. Over the first 2-month period, one of the critical postoperative rehabilitation principles is to minimize the amount of posterior tibial translation that may occur as a result of gravity and/or muscle contraction. Also, it is important to limit the number of knee flexion cycles to avoid PCL graft abrasion at either the tibial attachment or femoral attachment sites. This may be particularly important if a transtibial tunnel (killer turn) or an inside-out femoral tunnel technique (critical corner) are used.[31,41,42] Therefore, the operative limb is maintained in a long leg ROM brace locked in full extension, except for therapy and 1 hour of continuous passive motion per day. Guidelines for physical therapy are divided into 4 phases. The timeframe, goals, exercises, and visit frequency for these phases are outlined in Table 2.

Guidelines for activities of daily living include considerations for ambulation, bathing/showering, sleeping, and driving. Crutches are used for ambulation for 8 weeks with 30% weight bearing as tolerated with the brace locked in full extension. After this time, the crutches may be discontinued and the brace unlocked provided the patient has met the following criteria:

(1) No lag with a supine straight leg raise;
(2) Active and passive range of motion is at least 0° - 90°;

Table 2. Guidelines for Rehabilitation in Physical Therapy

Phase	Time Frame	Goals	Exercises	Attendance
I	0-1 month	1) Full knee extension 2) Knee flexion range of motion equal to 90° 3) Quadriceps strength ≥ 3/5 4) No signs of active inflammation 5) Understand postoperative rehabilitation precautions and expectations	Quad set Ankle pump Supine straight leg raise Hip abduction/adduction (Note: resistance is added proximal to the knee)	1x/week
II	1-3 months	1) Knee flexion range of motion equal to 125° 2) Quadriceps strength ≥ 4/5 3) Minimal to no pain complaints	8 weeks post-op Stationary bike without toe clips Closed kinetic chain terminal knee extension Stair master Balance and proprioceptive exercises Leg press from 0-90	2-3x/week
III	3-9 months	1) No limitation with activities of daily living 2) Limited resumption of recreational activities (ie, low impact)	Progression of closed kinetic chain exercises Walking on treadmill Jogging in pool Swimming (no breast stroke)	2x/month
IV	9-12 months	Full return to previous level of physical function and athletics	Sport specific training	1x/month

(3) Knee extension strength equal or greater than 3/5;
(4) No gait deviations.

Bathing and showering may be performed without the brace at the end of post-op week 1. The brace can be discontinued for sleeping 8 weeks post-op. The patient typically has sufficient range, strength, and neuromuscular control so that driving can be resumed at 8 weeks post-op. It should be noted that these guidelines may vary and the attending physician should always be contacted if questions or problems arise.

CONCLUSION

Surgery is indicated when pain and/or instability remain despite appropriate conservative intervention. The best graft choice and reconstruction technique remain somewhat controversial. Graft choice depends on balancing multiple factors, including availability of graft, patient preference, surgeon preference, and planned reconstruction technique. Transtibial tunnel, open tibial inlay, and arthroscopic tibial inlay are described techniques, each having its own advantages and disadvantages. Postoperative rehabilitation is divided into 4 phases. Each phase has specific time frames, goals, outline of exercises, and visit frequency.

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Use of Plyometrics in the Rehabilitation of a Female Lacrosse Player Following Patellar Dislocation

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ABSTRACT

Background and Purpose: Patellar dislocations most commonly occur in high-level adolescent athletes.[1-4] Previous research has shown that following typical rehabilitation protocols, athletes still have decreased participation in sports up to 6 months following injury.[1,5] No research to date has reported on the use of a plyometric training program in the rehabilitation of an athlete with this injury returning to sport. The purpose of this case report is to describe the effect that a plyometric training program had on one patient's recovery and return to sport after a lateral patellar dislocation. **Case Description:** The subject was a 16-year-old female who sustained a lateral patellar dislocation at lacrosse practice. **Intervention:** After 3 sessions of general quadriceps and core strengthening, the subject began a 9 session plyometric training program which was modified from a program by Hewett et al.[10] **Outcomes:** Results showed that on the 7th and 12th visits, the subject demonstrated improved performance in tests of lower extremity strength, jump to single leg land distance, vertical jump height, and running speed. **Discussion:** These outcomes suggest that a plyometric training program may have been beneficial in facilitating this patient's return to sport following an acute patellar dislocation.

Key Words: patellar dislocation, plyometrics, jump training, sports rehabilitation

INTRODUCTION

This case report describes the effect a plyometric training program has on recovery of a young female lacrosse player following an acute lateral patellar dislocation.

First time patellar dislocations most commonly occur in adolescent high-level athletes.[1-4] Nonoperative, conservative approaches to rehabilitation have shown that 6 months after dislocation, athletes continue to demonstrate decreased participation in sports.[1,3] Six months is a significantly long recovery time, especially when considering the short duration of high school sports seasons. Rehabilitation approaches to acute patellar dislocations involve open and closed chain quadriceps strengthening, patellar taping, and sport specific training.[1,2,4] No research to date has addressed the effect a plyometric training program may have on the recovery of an athlete following a patellar dislocation. This case study addresses the affect a plyometric training program has on rehabilitation time frames and return to sport following a patellar dislocation.

Patellar dislocations most commonly are a noncontact injury with lower extremity internal rotation with combined knee valgus on a planted foot.[2,4] A lateral dislocation is associated with injury to the medial patella femoral ligament (MPFL) and the cartilage surfaces of the patella and femur.[2,4-6] Research has shown that the MPFL contributes 53% to 80% of restraining force against lateral patellar displacement.[2,4,5]

Anatomical predispositions for a lateral patella dislocation include patella alta, trochlear dysplasia, ligamentous laxity, femoral anteversion, excessive midfoot pronation, and lateral facet dominance.[1,2,4,5] Patella alta is the most common anatomical feature among people who have sustained a patellar dislocation.[1,2,4,5] Research is inconclusive about a gender bias for a patellar dislocation and there is no predictive role for gender and family history.[5]

There has been minimal research on the rate of reoccurrence of lateral patellar dislocation following an initial dislocation and the research is dated. McNab[7] found a 15% redislocation rate and a 33% overall frequency of symptoms after initial dislocation. Other research has shown that the sequelae of patellar dislocation affects up to 50% of patients after injury.[1,8] It has also been suggested that young, active individuals are more prone to sequelae that impair their function.[1,9] Cash and Hughston[10] found that dysplasia of the uninjured knee increases the chance of recurrent patellar dislocations.[10] Larsen and Laurdisen[9] found the risk for redislocation to be considerably higher in patients who had their first dislocation in their teenage years, than those who had their first dislocation above the age of 20.[9]

Patellar dislocations can be treated conservatively or surgically. Surgical treatment is generally indicated when there is complete rupture of the MPFL, although surgical treatments often have unsuccessful results.[11,12]

Initially conservative treatment of acute patellar dislocation involved immobilization for up to 7 weeks, followed by physical therapy.[13] In the 1990s, research began to support the use of more functional rehabilitation programs without the period of immobilization. Research on conservative treatment approaches in recent years has suggested more aggressive treatment strategies should be adopted.

Garth et al[13] found that early aggressive functional rehabilitation is as effective as more conservative programs in which the knee was immobilized for up to 7 weeks with a 2 to 6 year period of follow-up. In the study by Garth et al[13] there were 58 athletic subjects who had experienced patellar dislocations. The subjects' treatment included straight leg raises followed by patella stabilization with a lateral padded knee sleeve, progressing to passive, active-assisted and active range of motion using a stationary bike, and isometric and isotonic exercises to strengthen the quadriceps. The subjects were asked to wear a knee sleeve until the quadriceps strength on the affected side was 80% of the uninjured limb. The subjects were allowed to return to full activities with the knee sleeve when full isotonic quadriceps strength returned, which took anywhere from 3 to 8 weeks postinjury.

Atkin et al[1] found that sports participation was significantly reduced during the 6 months following injury. This study looked at the recovery of 74 patients with first time acute lateral patellar dislocation. At

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6 months, 58% of the subjects had limitations with strenuous activities. Rehabilitation included knee immobilization with assisted weight bearing as tolerated (ie, with crutches). The patients then progressed to patella stabilizing braces, closed chain exercises, and passive range of motion (PROM). The patients were allowed to return to sports when full PROM was achieved, there was no effusion, and quadriceps strength was 80% of the noninjured limb. The patients were encouraged to wear patella-stabilizing braces for sports and other pivoting activities.[1]

These studies demonstrate the variety of conservative approaches that have been taken. However, no literature to date has described the use of plyometrics to help an athlete return to sport following a lateral patellar dislocation.

Originally plyometrics were used to enhance athletic performance; however, more recent research has focused on the use of plyometrics to facilitate return to sport following injury by correcting lower extremity imbalances, particularly imbalances between the hamstrings and quadriceps in female athletes.[14] Plyometrics are used for patients wanting to return to sport with explosive movements such as running, cutting, and jumping.[14] These are all movements involved in the sport of lacrosse.

Plyometric exercise has been reported to be successful in the prevention and rehabilitation of ACL injuries.[14] Atkin et al[1] found the level of activity of someone prior to sustaining an ACL injury is equal to that of someone sustaining a primary patella dislocation. In addition, the mechanism of injury for a patellar dislocation is similar to that of a noncontact ACL injury. The mechanism of injury for patellar dislocations has been previously described.[2,4] Noncontact ACL injuries occur with an extended knee initially then hip internal rotation and adduction with knee valgus and tibial external rotation on a pronated, externally rotated foot.[15] The similarities in the mechanisms of injuries suggest that a rehabilitation protocol successful for ACL injuries could also be successful for patellar dislocations.

Plyometrics have been proven to strengthen the hip external rotators, therefore resulting in lower incidence of excessive hip internal rotation in functional activity.[14] Also, plyometrics have been proven to help reduce abduction and adduction moments at the knee and reduce ground reaction forces.[20]

This study incorporates the use of plyometrics as a more aggressive therapeutic exercise approach for patients who have suffered lateral patellar dislocation. The purpose of this paper is to describe the effect of plyometrics in rehabilitation and subsequent return to sport of a young female lacrosse player following an acute lateral patellar dislocation.

PATIENT DESCRIPTION

The subject was a 16-year-old female lacrosse player with complaints of left knee pain secondary to a lateral patellar dislocation 10 days prior to her initial visit to physical therapy. The dislocation occurred during lacrosse practice when the subject was performing a right lateral lunge with her left knee extended. Her left patella laterally dislocated and spontaneously reduced. After the athletic trainer taped her knee, the subject continued to play lacrosse for an hour. After practice she reported a significant increase in pain and swelling in her left knee. The next day she went to a doctor who confirmed her patellar dislocation with a magnetic resonance image (MRI). The MRI revealed an osseous contusion along the lateral margin of the lateral femoral condyle, a partial tear of the MPFL, and a 9-millimeter fragment of articular cartilage avulsed from the lower pole of the patella. The subject was given crutches for 1 week with weight bearing as tolerated, a neoprene brace, and referred to physical therapy for 12 visits.

EXAMINATION

Upon initial examination the subject presented with intermittent pain which she rated as 0/10-10/10 (with 0 meaning "no pain", and 10 meaning "the worst pain imaginable"). She had no pain at rest and 10/10 pain was provoked with squatting, ascending and descending stairs, torsional movements, and lifting. The patient's first goal was to return to playing lacrosse within 8 weeks in order to be able to play in a major tournament. Her second goal was to run a mile in under 8 minutes and 30 seconds, a requirement of her lacrosse team, and a time she was able to run prior to injury.

Observation revealed edema and bruising inferior and medial to her left patella. The subject's standing posture revealed bilateral genu valgum, external tibial rotation, and foot pronation.

Functionally the subject was able to perform a quarter squat although with most of her weight shifted into her unaffected right lower extremity. She was able to ascend and descend stairs with a step-to gait pattern and the use of one handrail for balance.

Active range of motion in both knees was -5° to145°, measured with the subject in the supine position. Manual muscle testing was performed according to the methods of Reese, in which a scale of 0 to 5 is used.[16] Muscle testing revealed quadriceps weakness of the affected side (2+/5), as the patient had difficulty initiating quadriceps contraction and was unable to fully extend her knee against gravity in a sitting position. The patient also demonstrated hip flexor strength deficits on the affected side (4/5). In addition bilateral muscle weakness was identified in her hamstrings, gluteus maximus (4+/5), and hip abductors (4/5) (Table 2).

Examination of the subject's patellas revealed that both had a lateral tilt at rest. Passive accessory motion of the subject's patellas identified hypermobility in the medial to lateral direction. The patellar compression test, per Magee,[17] produced pain deep to the patella on the affected side.

The Ober test is a measure for iliotibial band tightness, and the Carter and Wilkinson's test measures general joint laxity.[17] Both tests were performed according to Magee[17] with positive findings.

On the third visit, when the quality of the subject's active quadriceps contraction had improved, her jump to single leg land distance and vertical jump height were measured. The jump to single leg land was performed with the subject standing on both feet, jumping, landing on one leg, and sticking the land for 3 seconds. The distance was measured from toe to toe when the subject could stick the landing for 3 seconds. The jump to single leg land has been proven reliable[18] and has been used to quantify results from plyometric training programs.[19] The subject's jump to single leg land distance on the right lower extremity was 129 centimeters (cm) and on her left was 97 cm (Table 3).

The vertical jump height was performed with the subject standing next to a wall, then performing one maximal effort jump and touching the wall as high as possible with one hand. The height was measured from the floor to the highest point she could touch with her fingers. The vertical jump height is an objective measure that has been used in other studies to quantify the effect of plyometric training programs,[19-21] and has also been proven reliable.[18] The subject's vertical

Table 1. Jump Training Program Modified from Hewett el al[20]

Exercise	Repetition or Time		
Phase I: Technique	**Visit 4**	**Visit 5**	**Visit 6**
1. Wall tucks	20 seconds	25 seconds	30 seconds
2. Tuck jumps	20 seconds	25 seconds	30 seconds
3. Broad jumps stick land	5 reps	10 reps	15 reps
4. Squat jumps	10 seconds	20 seconds	30 seconds
5. Double leg cone jumps	30 seconds	30 seconds	30 seconds
6. 180° turns	20 seconds	25 seconds	30 seconds
7. Bounding in place	20 seconds	25 seconds	30 seconds
Phase II: Fundamentals	**Visit 7**	**Visit 8**	**Visit 9**
1. Wall jumps	30 seconds	30 seconds	30 seconds
2. Tuck jumps	30 seconds	30 seconds	30 seconds
3. Jump, jump, jump, vertical jump	5 reps	8 reps	11 reps
4. Squat jumps	20 seconds	20 seconds	20 seconds
5. Bounding for distance	1 run	2 runs	3 runs
6. Double leg cone jumps	30 seconds	30 seconds	30 seconds
7. Scissor jump	30 seconds	30 seconds	30 seconds
8. Hop, hop, stick	5 reps per leg	5 reps per leg	5 reps per leg
Phase III: Performance	**Visit 10**	**Visit 11**	**Visit 12**
1. Wall jumps	30 seconds	30 seconds	20 seconds
2. Step, jump up, down, vertical	5 reps	10 reps	15 reps
3. Mattress jumps	30 seconds	30 seconds	30 seconds
4. Single-leg jumps distance	5 reps per leg	5 reps per leg	5 reps per leg
5. Squat jumps	25 seconds	25 seconds	25 seconds
6. Jump into bounding	3 runs	4 runs	5 runs
7. Single-leg hop, hop stick	5 reps per leg	5 reps per leg	5 reps per leg

reps=repetitions

Definitions of Jump Exercises:

1. 180° Jumps: Two-footed jump. Rotate 180° in midair. Hold landing 2 seconds then repeat in reverse direction.
2. Bounding for distance: Start bounding in place and slowly increase distance with each step, keeping knees high.
3. Bounding in place: Jump from one leg to the other straight up and down, progressively increasing rhythm and height.
4. Broad jumps-stick (hold) landing: Two-footed jump as far as possible. Hold landing for 5 seconds.
5. Cone jumps: Double leg jump with feet together. Jump side-to-side over cones quickly. Repeat forward and backward.
6. Hop, hop stick: Single legged hop. Stick second landing for 5 seconds. Increase distance of hop as technique improves.
7. Jump into bounding: Two-footed broad jump. Land on single leg, then progress into bounding for distance.
8. Jump, jump, jump, vertical: Three broad jumps with vertical jump immediately after landing the third broad jump.
9. Mattress jumps: Two-footed jump on mattress, tramp, or other easily compressed device. Perform side-to-side/back to front.
10. Scissors jump: Start in stride position with one foot well in front of other. Jump up, alternating foot positions in midair.
11. Single-legged jumps distance: One-legged hop for distance. Hold landing (knees bent) for 5 seconds.
12. Squat jumps: Standing jump raising both arms overhead, land in squatting position touching both hands to floor.
13. Step, jump up, down, vertical: Two-footed jump onto 6-to-8 inch step. Jump off step with two feet, then vertical jump.
14. Tuck jumps: From standing position jump and bring both knees up to chest as high as possible. Repeat quickly.
15. Wall jumps (ankle bounces): With knees slightly bent and arms raised overhead, bounce up and down off toes.

jump height was 231 cm (Table 4). There are no documented normal ranges for vertical jump height and past research has used vertical jump height as a measure to indicate improvement within each patient.[19-21]

INTERVENTION

The subject was seen in an outpatient private physical therapy clinic for a total of 12 visits over a period of 9 weeks. Each visit was about 60 minutes in length. At the beginning of each session McConnell taping methods[22] were used on the left patella in order to support the patella in a more medial position and protect the healing MPFL. Consistent with what has been reported in

Table 2. Lower Extremity Strength Measurements[16]

Muscle Group	Visit 1		Visit 7		Visit 12	
Lower Extremity	Left	Right	Left	Right	Left	Right
Hip flexors	4	5	5	5	5	5
Quadriceps	2+	5	4	5	4+	5
Hip abductors	4+	4+	5	5	5	5
Hip adductors	5	5	5	5	5	5
Gluteals	4+	4+	5	5	5	5
Hamstrings	4+	4+	5-	5	5-	5

Table 3. Jump to Single Leg Land Distances[18,19]

	Visit 3		Visit 7		Visit 12	
Lower Extremity	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**
Jump to Single Leg Land	97 cm	129 cm	110 cm	144 cm	123cm	149cm
cm=centimeters						

Table 4. Vertical Jump Heights[19-21]

	Visit 3	Visit 7	Visit 12
Vertical Jump Height	231 cm	233 cm	237 cm
cm=centimeters			

the literature, it was immediately found that the subject was able to initiate more quadriceps contraction and was able to perform exercises pain free when her patella was taped medially.[22-24] Recent research suggests that patellar taping may be beneficial due to its effect on proprioceptive input.[25]

During the first 3 visits, rehabilitation techniques were chosen that were consistent with what the current research supports.[1,13] These techniques focused on open and closed chain quadriceps strengthening performed in the sagittal plane, as well as core strengthening. Consistent with recommendations in current literature, plyometric training was not introduced until the subject had an adequate base of strength and neuromuscular control and was able to perform functional movements in proper form.[14] The literature providing these recommendations did not define an adequate base of strength and neuromuscular control, therefore assumptions had to be made about their definitions. By the fourth visit the subject was able to fully extend her affected leg against gravity and maintain that position with minimal resistance applied by the therapist (3+/5) which suggested she had an adequate base of strength; she could perform a squat with equal weight bearing, which suggested she could perform functional movements in proper form; and she had an adequate base of neuromuscular control demonstrated through dynamic balance on a Bosu® ball. According to Chmielewski and colleagues,[14] these findings suggested that she was ready to begin a plyometric program.

The plyometric program was adapted from Hewett et al[20] (Table 1), and consisted of 3 phases; each phase was performed over 3 visits, resulting in a total of 9 sessions. The 3 phases were the technique phase, the fundamentals phase, and the performance phase. The technique phase of the plyometric program involved making sure the patient had correct technique with jumps, including an erect spine, landing with bent knees, and jumping straight up without excess side-to-side motion. The fundamentals phase of the plyometric program emphasized using the correct technique to build a base of strength and power. The performance phase of the plyometric program focused on achieving maximum height with jumps. There were 30 seconds rest time allotted between exercises.[20]

In addition to the plyometrics, these 9 sessions also included lower extremity stretching of the quadriceps, hip flexors, iliotibial band, gluteals and hamstrings, strengthening of the core and lower extremity, and balance exercises, all performed prior to the plyometric portion. These interventions were consistent with the Hewett el al study, and these interventions addressed the subject's identified impairments of lower extremity and core strength deficits.[20] In addition, a review article by Witvrouw et al[26] concludes that stretching as a warm-up is beneficial in preventing injuries in sports with high-stretch shortening cycle movements, such as plyometrics.

OUTCOMES

Measures of strength were performed during the first visit, and tests of jump to single leg land distance and vertical jump height were performed during the third visit. Her mile time prior to injury was self-reported. All tests and measures were reexamined on the 7th and 12th visits, and the results described below.

At the seventh visit, functional gains were documented when the subject was able to demonstrate the use of a step-through pattern on stairs and perform a half squat with apparent equal weight bearing on each

leg. Measures of left quadriceps strength increased to 4/5, while her bilateral gluteus maximus and hip abductors strength increased to 5/5. Her left hamstrings strength increased to 5-/5 and her right hamstrings 5/5 (Table 2). She demonstrated increased jump to single leg land distance for both the right (129 cm to 144cm) and left (91 cm to110 cm) lower extremities (Table 3) (Figure 1). Her vertical jump height also increased (231 cm to 233 cm) (Table 4) (Figure 2). Her mile time was recorded as 8 minutes and 15 seconds. By the seventh visit the subject had returned to playing lacrosse with a knee brace. She had a self-reported recovery of 80%.

At the 12th visit, the subject's lower extremity strength had increased to 5/5 bilaterally in all areas tested with the exception of the left quadriceps (4+/5) and left hamstrings (5-/5) (Table 2). She had further increased her jump to single leg land distance between the 7th and 12th visit for both the right (144 cm to 149 cm) and left (110 cm to 123 cm) lower extremities (Table 3) (Figure 1). Her vertical jump height also increased between the 7th and 12th visit (233 cm to 237 cm) (Table 4) (Figure 2). Her mile time improved to 7 minutes and 35 seconds. On the 12th visit she had a self-reported recovery of 90%. She explained that her recovery was not complete because of strength deficits in her quadriceps on the affected side, and she agreed to continue strengthening her quadriceps using equipment at her school gym after discharge.

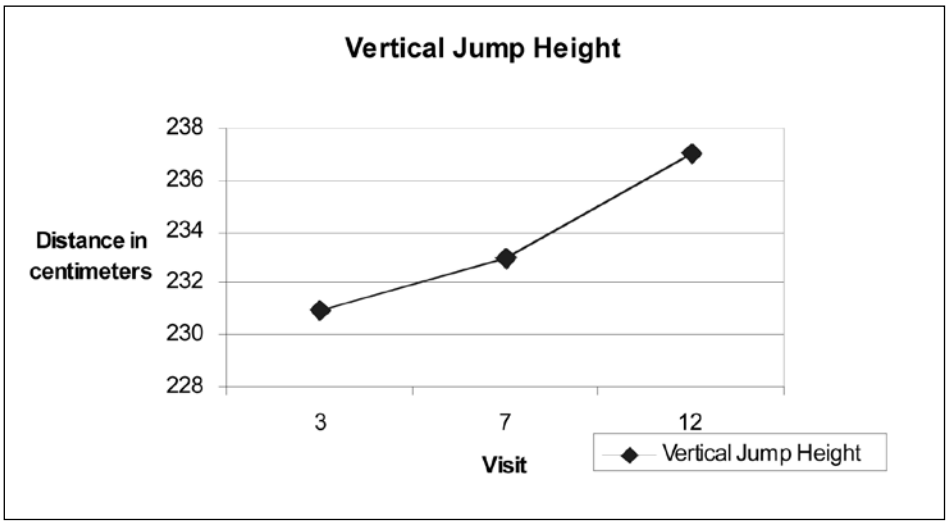

Figure 2. Vertical jump heights.

DISCUSSION

The purpose of this case report was to describe the implementation of a plyometric training program to aid a young female lacrosse player in her return to sport following an acute lateral patellar dislocation.

Prior research has shown that up to 6 months after a lateral patellar dislocation, athletes still have some limitations with sport participation.[1,5] In this study, the subject was able to return to sport 8 weeks postinjury, although at that time her self-reported recovery was 80%. By the time of discharge from physical therapy, 11 weeks postinjury, the subject had a self-reported recovery of 90%. Because this is a short-term study, it is unknown how long the subject will take to reach full sport participation, but her current rate of recovery and outcomes to date imply it will be less than 6 months postinjury. Therefore, it is reasonable to propose that plyometrics did have a positive effect on decreasing the average recovery time and time to return to sport reported for patients following patellar dislocation. It is important to consider the risks associated with initiating plyometric training too early in the rehabilitation process. These risks include an exacerbation of symptoms or delayed onset muscle soreness (DOMS), both of which could adversely affect the rehabilitation process resulting in a delayed recovery time. In addition to ensuring that the patient have an adequate base of strength and neuromuscular control and is able to perform functional movements in proper form, Chmielewski et al[14] suggest that the patient should be able to tolerate activities of daily living without pain or swelling before initiating a plyometric training program in order to avoid an exacerbation of symptoms.[14]

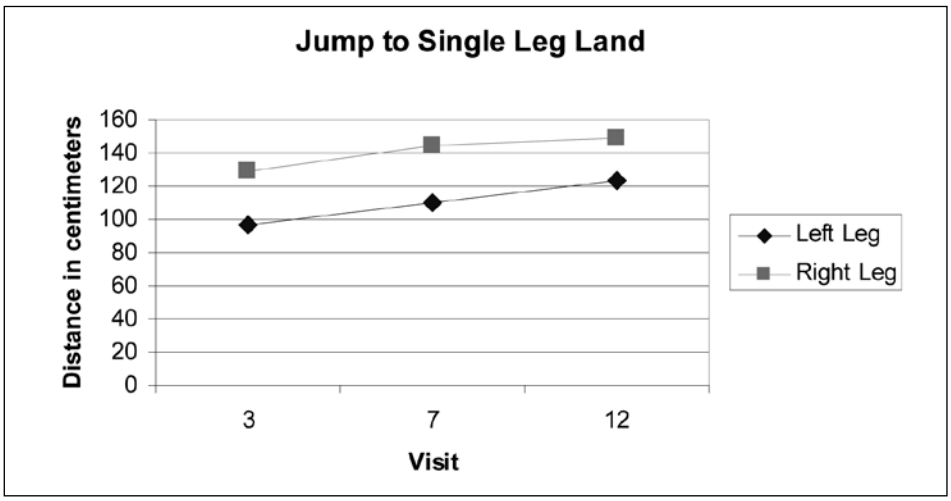

Figure 1. Jump to single leg land distances.

The plyometric program that was adopted for this patient's rehabilitation plan was based on that described by Hewett et al.[20] These authors described a program implemented for 6 weeks, 3 times a week. This frequency of visits was not possible with this subject's schedule, and thus the program was modified to fit within 9 visits over 8 weeks. Even with the shorter intensity of training, this subject still demonstrated outcome results that exceeded those reported by Hewett et al.[20] Hewett et al[20] found a 3.81cm average vertical jump height increase over a 6-week training period. This case study found a 6 cm increase in vertical jump height over a less intense 8-week period. A study by Myer et al[19] also implemented a plyometric program for 6 weeks, 3 times a week. Results of their research showed that single-leg hopping distance increased an average of 10.4 cm on the right and 8.5 cm on the left over the 6-week training period.[18] The results of this case study exceeded the results of the study by Myer et al[19] and found an increase

in the left lower extremity of 25 cm and in the right lower extremity 20 cm.

One of the subject's goals was to run a mile in under 8 minutes and 30 seconds and by the 7th visit she had already exceeded this goal. By the 12th visit her mile time was 45 seconds faster than her self-reported prior level of function.

There are a number of limitations to this case report. First, the subject's participation in physical therapy was limited to once or twice a week, and there were 2 weeks (between the forth and fifth visit and between the sixth and seventh visit) where she missed an entire week of therapy because of school commitments and travel. In addition, the subject began to play lacrosse again by the 7th visit; therefore, it is unclear if the final results taken on the 12th visit are due solely to the plyometrics or to the combination of plyometrics and lacrosse.

This subject was last examined at time of discharge, 2 months after injury, at a self-reported 90% level of recovery. Ideally the author would have had the opportunity to follow the patient's progress after time of discharge, in order to determine whether or not she achieved 100% recovery, and if so, how long it took. These results could then be compared to the research findings by Atkin et al[1] citing persistent limitations in sports participation 6 months after injury.

It would be beneficial to build on this single patient case report, and to conduct either another single case study, or ideally a larger study, with more controlled conditions, including more consistent physical therapy intervention intervals. Because of the irregularity of visits noted in the rehabilitation of this subject, it is unknown whether or not more frequent visits initially could have even further decreased her recovery time.

Overall from this case report it can be concluded that plyometrics can be considered as a component in rehabilitation for patients following a patellar dislocation.

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A Comparison of Two Methods of Assessing Transverse Abdominal Muscle Thickness in Participants Using Real-Time Ultrasound in a Clinical Setting

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ABSTRACT

Study Design: Test-retest reliability study. **Objectives:** To assess test-retest reliability of two different methods for collecting transverse abdominus (TrA) thickness measurements using real-time ultrasound (RTUS). **Methods and Measures:** A convenience sample of 70 persons without low back pain in the past 6 months participated. The mean age for groups one and two were 38.7 ± 13.3 and 35.2 ± 12.8, respectively. There were 49 females and 21 males. The General Electric LOGIQ Book CFM/Doppler real-time ultrasound unit was used. Self-reported BMI was recorded by asking each participant to find their weight and height on a provided chart. Participants were positioned supine, with one researcher operating the RTUS unit and the other the transducer. For those in the Initial Assessment (IA) group, the images were recorded and measured immediately with the participant present. For those in the Deferred Assessment (DA) group, the images were stored, and measured at a later date. For all participants, the images of the right TrA was collected first, then the left. For test-retest purposes, the same process was then immediately repeated. Intraclass correlation coefficients (ICC) were used to estimate test-retest reliability and standard error of measurement (SEM) values to estimate measurement error across and within groups. **Results:** ICC values ranged from 0.71-0.97. The TrA thickness values ranged from 0.22 centimeters (cm) (relaxed) to 1.12 cm (contracted), and SEM values ranged from 0.01-0.10 cm. **Conclusions:** Although it appears to place an increased burden on the participants' time commitment, collecting RTUS images and *immediately* measuring the images results in slightly improved reliability.

Key Words: lumbar stabilization, real-time ultrasound imaging, transverse abdominus, reliability

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INTRODUCTION

Chronic low back pain (CLBP) is the most common complaint of the working-age population.[1] Eighty percent of Americans experience low back pain in their lifetime with 15% to 20% reporting low back pain at any given time.[2,3] The 1-year prevalence of acute low back pain has been estimated at 65%.[4,5] Back pain complaints precipitate more physician visits annually than any other malady except for the common cold.[6] The economic burden of CLBP is in the order of billions of dollars in medical expenditures and lost wages.[7,8] It is estimated that treatment for back pain accounts for 75% to 90% of the medical costs incurred by persons who have CLBP.[9] In addition to the financial costs, CLBP substantially impacts the quality of life of affected persons.

A number of physical therapy interventions exist for treating persons with musculoskeletal problems. Several studies have documented the benefit of trunk stabilization exercises for persons with CLBP.[10-14] An important muscle involved in trunk stabilization is the transverse abdominus muscle (TrA), and there is empirical evidence that this muscle may be an appropriate target for intervention.[10,11,15] The TrA of persons with CLBP has been shown both to be thinner and to exhibit delayed firing when compared to the TrA of persons without CLBP.[15-17]

Effective evaluation of the role of the TrA in CLBP and its treatment depends on the existence of a reliable tool for measuring this muscle. Real-time ultrasound (RTUS) has been used to measure the thickness of the TrA at rest and with contraction, but only a few studies have evaluated the reliability of RTUS-based measures.[18-20] These studies used an RTUS machine to collect images of the TrA at rest and with a contraction. The thickness of the TrA on those images was measured and recorded. Reliability was assessed by taking two images and comparing the two values of the TrA thickness.

Two approaches are available for obtaining RTUS measures. With the immediate assessment (IA) approach, measurements are obtained at the time the images are taken. With the deferred assessment (DA) approach, the images are saved electronically and the measurements are obtained at a later date. The measuring of the TrA thickness by either approach can be somewhat time-consuming, resulting in a considerable increase in the amount of time necessary for the patient to be present with the IA approach. Although no empirical data is available, it is estimated that using the IA approach would at least double the time involved with the patient present. Therefore, it could be estimated that the DA approach would take approximately 20 minutes and the IA approach would take 40 minutes of the participant's time. However, it could be argued that a more accurate measurement is obtained if it is taken immediately after the image is taken because the researcher can clearly recall the movement of the muscles during the image collection process. The published studies that evaluated the reliability of RTUS measures used the IA approach. Schmidt and colleagues achieved an inter-rater reliability value of 0.96 while obtaining joint tendon measurements.[19] Similar values have been achieved in measuring the thickness of the TrA. In two studies, test-retest reliability exceeded an ICC of 0.93.[18,20]

There are no published studies evaluating the reliability of RTUS measures obtained from saved electronic images. The purpose of

this study was to compare the reliability of RTUS-based estimates of TrA thickness based on immediate and deferred assessments. An additional problem previously encountered by the current researchers was the amount of soft tissue of some patients in this area that has resulted in poorer-quality images and deeper penetration required by the RTUS. Therefore, in addition to comparing the reliability by method for the group as a whole, comparisons were made within two ranges of self-reported Body Mass Index (BMI), BMI ≤ 25 and BMI > 25.

METHODS

Subjects

A convenience sample of 70 persons participated in the study. Participants were recruited from 1 community hospital and 1 university. Half were measured using the IA approach, and half using the DA approach. Excluded were those with contraindications for the use of RTUS such as pregnancy, previous malignancy, symptoms of current malignancy, or current infection.[21] Participants also were excluded if they had a history of low back pain lasting over 3 days in the past 6 months or if they had ever had low back surgery.

Instrumentation

For the current study, the General Electric LOGIQ Book CFM/Doppler real-time ultrasound unit was used. The unit is portable and has a hand-held receiver with a 4-11 MHz broad spectrum linear transducer with a 39 mm aperture. Images were collected, measured and stored on the system's hard drive, and later transferred to a desktop computer to use a statistical software system for data analysis.

Procedures

Persons willing to participate and meeting the inclusion/exclusion criteria received a full explanation of the study procedures by one of the study investigators. Those who wished to participate gave written consent using an institutionally-approved consent form. Each participant's BMI was collected by self-report. Participants used a readily available on-line BMI chart to identify and report their BMI based on their approximate height and weight.

Participants were asked to lie on a treatment table on their back with their knees flexed. Their waistband was lowered and appropriate draping was applied to the area. One researcher manned the hand-held transducer and another operated the unit computer. Water-soluble gel was applied to the head of the hand-held transducer, and it was placed over the participant's right abdomen approximately midway between the iliac crest and the ribs, approximately 2.5 cm from the side of the body[18] (Figure 1). Participants were instructed to relax and breathe normally. At the end of participant exhalation, an image of the right TrA at rest was taken and saved electronically (Figure 2). During data collection, participants were not allowed to view images on the screen. If the participant was in the IA group, the researcher stationed at the RTUS computer immediately measured the linear thickness of the TrA in centimeters. See Figure 2 as an example, with the box in the lower left-hand corner specifying linear thickness of the TrA. For those in the DA group, the TrA was not measured until a later date.

Participants were then asked to contract their TrA in isolation by performing a pelvic floor contraction or bracing contraction, with the researcher using phrases such as "draw your bellybutton in towards your spine" or "lift your pelvic muscles." Two or three practice trials were given to each participant without the participant being able to view the computer screen. The test contraction was then completed on the right side, and an image of the contracted right TrA was taken. If the participant was in the IA group, the researcher manning the RTUS computer measured the thickness of the TrA.

Figure 1. Positioning of patient for collection of TrA image.

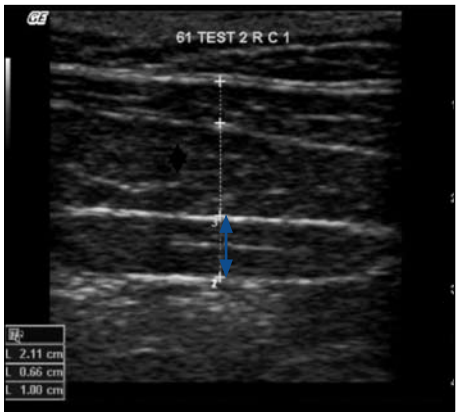

Figure 2. Image of thickness measurement of TrA (blue double arrow).

The same process was repeated on the left side, completing Trial #1. For purposes of test-retest intra-rater reliability, the researcher then obtained second images of right and left TrA at rest and during contraction (Trial #2). All of the images saved for the DA group were measured within the week by a third researcher in her office. For those that participated in the IA group, all measurements were taken before the image was saved, by the same researcher at the computer during data collection. For the IA group the image measurements were embedded on the saved image, thus disallowing comparison of images using the DA technique at a later date.

Data Analysis

Intraclass correlation coefficient (ICC) values were computed for the participants in the IA group, and for those in the DA group with the TrA at rest and during contraction for both the right and left side. To determine whether ICC values were different based on self-reported BMI, ICC values were calculated for those with self-reported BMI ≤ 25 and those with BMI >25 for each group. Standard error of measurement (SEM) values were calculated for each measure using the formula, SEM = SD$\sqrt{1-r}$, with SD = standard deviation of the measure, and r = intraclass correlation coefficient value.[22,23]

RESULTS

The assessment groups were similar with respect to age and gender. In the DA group, there were 22 females and 13 males with a mean age of 38.7 years (SD 13.3), and mean BMI of 25.4 (SD 3.3). In the IA group, there were 27 females and 8 males with a mean age of 35.2 years (SD 12.8), and mean BMI of 25.3 (SD 4.4).

ICC and SEM values for the two methods were calculated, using SPSS, version 11.5. ICC values ranged from 0.71-0.97. The TrA thickness values ranged from 0.22 cm (relaxed) to 1.12 cm (contracted), and SEM values ranged from 0.01-0.10 centimeters (cm). See Table 1.

Table 1. Calculated intraclass correlation coefficient (ICC) and standard error of measurement (SEM) values (in parentheses) for the transverse abdominus muscle (TrA) for the deferred assessment and initial assessment groups (all and for those with a body mass index (BMI) ≤ 25 and >25).

Group Assignment	TrA	All	BMI ≤ 25	BMI > 25
Deferred Assessment		N=35	N=18	N=17
	Right Relaxed	.87 (.04)	.87 (.03)	.86 (.04)
	Right Contracted	.83 (.07)	.80 (.05)	.83 (.08)
	Left Relaxed	.90 (.03)	.80 (.04)	.93 (.03)
	Left Contracted	.91 (.06)	.87 (.05)	.91 (.07)
Immediate Assessment		N=35	N=21	N=14
	Right Relaxed	.83 (.03)	.71 (.04)	.92 (.03)
	Right Contracted	.81 (.09)	.79 (.10)	.86 (.07)
	Left Relaxed	.93 (.02)	.90 (.03)	.97 (.01)
	Left Contracted	.92 (.04)	.92 (.04)	.95 (.03)

DISCUSSION

The ICC values for TrA thickness using both assessment methods were comparable to those obtained in previous studies.[18,20] However, reliability values were slightly higher for the IA than for the DA, although it places an increased burden on the patient in terms of time commitment.

It was suspected that ICC values would be lower for TrA thickness in participants with a higher self-reported BMI. Although the ICC values did not reflect a substantial difference, the researchers experienced more difficulty in obtaining usable images in those with larger BMI in both groups. It may be that there are certain circumstances in which obtaining images in persons with higher BMIs would result in higher reliability values and be less difficult for the researcher, such as with participants with higher muscle mass. This may be reflected in future research findings.

The results suggest there may be a practice effect in obtaining RTUS measurements. ICC values were higher for the measurements taken on the left side. For every participant, the researchers collected data first for the right TrA. The participants' ability to recruit their TrA may have improved with practice resulted in higher ICC values for the second (left) side. Our results are based only on measurements taken while the participant is in a supine position. Future research should compare the reliability of RTUS measurements taken in other positions such as sitting or standing. Evaluations of reliability in other positions have been undertaken,[24] but comparisons have yet to be made between deferred and immediate assessment.

CONCLUSION

Although it appears to place an increased burden on the participants' time commitment, collecting RTUS images, and *immediately* measuring the images results in improved reliability. It appears that there are minimal differences in TrA thickness ICC values in persons with BMI values below 25 from those above 25 in this sample of persons without low back pain.

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IRB approval received through Texas Woman's University and Harris County Hospital District Institutional Review Boards in Houston, TX.

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The Importance of the PTA in Exercise Instruction

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In most clinics, the Physical Therapist Assistant (PTA) plays an essential role in administering various aspects of the patient treatment plan. While utilization of the PTA differs in each treatment setting, they are most often the clinician responsible for exercise instruction. The PTA should be able to carry out an exercise program that not only takes into consideration the diagnosis, but also the age, comprehension level, and exercise tolerance of each individual patient. Typically, the PTA works very closely assisting patients and more importantly, providing hands-on instruction and stressing postural awareness throughout the exercise program. Ultimately the PTA is responsible for recognizing problems, making recommendations, and effectively communicating with the supervising physical therapist. In reality many patients are not compliant with their home exercise program and even the most conscientious patient may perform exercises incorrectly. The PTA fulfills a vital role in continually reviewing patient performance thereby optimizing treatment. Figures 1 through 3 illustrate basic exercises that are often times performed incorrectly.

Appropriate exercise instruction and modification as well as patient education are all areas where the expertise of the PTA can be most effective in allowing patients to reach their goals. As our field is evolving, we as Physical Therapy professionals need to take a broader view of the overall instruction of therapeutic exercise.

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Common Errors in Exercise Performance

Exercise	Incorrect Technique	Correct Technique
Chin Tuck (Figure 1A & B)	• Forward Head • Forward Shoulders • Poor Overall Posture	• Retract Chin • Shoulder Blades Retracted • Pelvic Neutral Spine
TKE (Figure 2A & B)	• Heel Lifted • Trunk Flexed • Hyperlordosis	• Heel Planted • Pelvic Neutral Spine • Shoulder Blades Retracted • Elbows In Line with Trunk • Core Engaged
Scapular Retraction (Figure 3A & B)	• Forward Head • Forward Shoulders • Elbows Extended Beyond Line of Body	• Cervical Spine Neutral • Shoulder Blades Retracted • Elbows in Line with Trunk • Core Engaged

Figure 1A.

Figure 1B.

Figure 2A.

Figure 2B.

Figure 3A.

Figure 3B.

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lettertoeditor

Mary Kay Zane, PT, MEd, OCS

I would like to respond to the editorial response in *Orthopaedic Physical Therapy Practice* Vol. 19, No. 2 by Robert J. Shaw, PT, MS regarding the lack of Evidence Based Practice (EBP) mentoring for students in the clinic.

While I agree that the use of EBP may be less prevalent among longer practicing therapists due to a difference in how they were educated, I do not think we can generalize to that entire population either. Indeed, I am sure that there are therapists of all ages out there who are unfamiliar with the concept of evidence based practice, or simply do not trouble themselves to utilize it. Age may be a part of the problem you discussed, but we must remember that it is this 'older' group of therapists who have brought us to the point of EBP in the first place. You report in your editorial that "a large portion of therapists also report that they were interested in improving their skills…", and that "perhaps there are reasons other than 'unwillingness' that might explain this failure [of EBP use of clinics]." In an evidence based world, we should look at all of the factors that could be significantly impacting this lack of EBP in the clinic. I would like to suggest several factors that would be strong possible influences to this problem, other than a 'generation gap'.[1]

I for one see the current practice environment as a major deterrent to practicing with EBP, and with disseminating it to younger therapists. In today's practice environment, productivity demands (57.9% of respondents to 2005 practice survey report a productivity standard required by their facility) and high levels of demand for services result in limited time and energy to devote to keeping up with research.[2] It is also a challenge for the basic clinician to keep up with physical therapy and related medical research at the pace it is coming out. Disseminating it to staff and applying it in the clinic is an equal challenge. A determined effort must be made, and a therapist must devote personal time to be successful.

Another major factor that I believe interferes with EBP is that there may not be enough clinic time allotted for mentoring and staff development. If we look at our own APTA Practice Pattern Survey from 2005, we can see that only 1.4% to 4.6% of a therapist work week was spent on critical inquiry and clinical education combined.[2]

I also see the 'bottom line' as a much greater deterrent to our development as autonomous practitioners who use evidence to guide practice. For example, the therapist must first meet the demands and reality of financial survival in a world with lacking reimbursement. This factor necessitates maximal scheduling of billable clinical time for each therapist. In addition to this, documentation requirements consume great amounts of time. The APTA practice survey shows that a therapist spends between 15.6% and 20.1% of their week on paperwork. This documentation must be done adequately in hopes of obtaining optimal reimbursements.[2] In my experience, documentation often consumes any downtime that may occur in the clinic, lunch hours, as well as unpaid overtime. This would hamper times that might be available for discussing literature or, communication with students regarding clinical issues/EBP.

For these reasons, I believe time devoted to evidence based practice is most likely lacking in the general physical therapy population, given a new or longer practicing therapist. I also believe that the real 'bottom line' of EBP lies with the individual PT. We need to personally make a committed effort to update practice based on evidence. We also must garner support from our administrators to support development of staff and students with EBP.

REFERENCES

1. Shaw RJ. Evidence-based practice in physical therapy: let's choose wisely. *Orthopaedic Physical Therapy Practice*. 2007;19:69-70.
2. 2005 Practice Profile Survey, American Physical Therapy Association; 2006.

editorresponse

Robert J. Shaw, MS, PT

I would first like to thank Mary Kay Zane for her consideration and response on this topic. Let me start by saying that I fully recognize the contributions made by our veteran therapists as it relates to evidence based practice. Indeed, many of those researchers and clinician/researchers responsible for the growing body of evidence in physical therapy are "veteran therapists." The Physical Therapy profession is in a much better place because of their past and ongoing efforts. I also realize that there are certainly veteran therapists ("veteran" being based on time in which they were formally educated and not necessarily on age, although, there would be an obvious high correlation) who are quite adept at evidence-based practice. In fact, these are likely some of the better clinicians in our field as they would be able to combine the best of their experience and the current evidence (2/3 of the EBP triumvirate). Yet we must also recognize that there likely exists a significant subset of veteran clinicians (as stated in the editorial, this is based on feedback to professors, therapist self reports, and systematic reviews of medical practice) who lack certain evidence-based skills.

Our challenge as clinicians, and as a profession, is to discover and implement strategies that will allow ***all*** therapists to become evidence-based practitioners as envisioned in the American Physical Therapy Associations Vision 2020. It has been recognized that TIME is one of the chief barriers to fully achieving this goal. You have mentioned many factors which you feel contribute to this TIME barrier, including "high levels of demand for services," "productivity demands," lack of "clinic time devoted to mentoring and staff development," "documentation requirements," and "maximal scheduling" (in order to achieve financial survival). These are personal examples that I am sure would be mirrored by many of our colleagues. You can see that many of these issues will need to be addressed at the level of the clinic or clinician him/herself. I fully agree with your statement that the responsibility ultimately falls to the individual PT. It is up to each one of us to develop our EBP skills and to push our clinics to be more evidence-based. On that level there will be innumerous strategies based on individual and clinic specific needs and demands.

I also believe that the APTA has a critical role in allowing us to meet this challenge. I am confident that they will continue to take steps to usher in this new era of PT practice as set forth in Vision 2020. In fact, the APTA/Physical Therapy Journal have (this past month) begun to make podcasts of "The Bottom Line" available from their website. As stated in the editorial, I believe that using this audio format is one method by which we can allow clinicians to overcome this TIME barrier. I am sure there will also be new strategies that will emerge as we advance in this process. But whatever these strategies might be, as you stated, we as a profession and as individual clinicians need to remain committed to overcoming these barriers and updating our practice based on the evidence. That is the key ingredient. That is something on which we would all agree.

Anderson DG, Vaccaro AR, eds. Decision Making in Spinal Care. New York, NY: Thieme; 2007, 504 pp., illus.

This text covers the classification, evaluation, treatment options, outcomes, and complications of various spinal problems. These conditions range from trauma to osteoporosis. There are 70 chapters covering a variety of topics. Each chapter, though brief, is concise and thorough. The editors' primary audience is the physician who treats spinal disorders, so basic, introductory material is omitted. Every chapter begins with an algorithm. These algorithms are clear and easy for the reader to follow. They would also be a tremendous resource to reference quickly in the clinic or the emergency room.

The first 9 chapters cover cervical trauma. Here, injuries to the occipitoatlantal region are described as well as the various types of fractures/dislocations that occur in the cervical spine. The next 5 chapters cover thoracolumbar trauma. A chapter on sacral fractures is also included. Cervical degenerative and metabolic diseases are discussed in the following 9 chapters. In this section disorders such as whiplash, cervical myelopathy, radiculopathy, and disc degeneration are featured. In this section is a chapter, Cervical Rehabilitation and Physical Therapy Techniques. The basic tenets and thought processes of the physical therapy approach to treating patients with cervical dysfunction are presented. The algorithm is based on findings of the evaluation instead of being diagnosis driven. There are 3 chapters dealing with thoracic degenerative and metabolic diseases. Ankylosing spondylitis and its effect on fracture management is discussed in this section.

The chapters included in the section, Lumbar Degenerative and Metabolic Diseases, include lumbar disc disease and low back pain, lumbar radiculopathy, lumbar stenosis, lumbar degenerative spondylolisthesis, degenerative scoliosis, adult isthmic spondylolisthesis, failed back syndromes, lumbar injections and procedures, and cuada equina syndrome. This section is characterized by excellent photographs of the imaging studies. A chapter entitled Lumbar Rehabilitation and Physical Therapy Techniques can be found in this section. This chapter is similar to the chapter relating to the cervical spine in stressing the basic thought process that a physical therapist undergoes when treating a patient with signs and symptoms of lumbar disorders. There are shorter sections covering scoliosis, kyphosis, and spondylolisthesis.

Spinal tumors and spinal infections and inflammatory diseases are dealt with in the next 2 chapters; rheumatoid arthritis of the cervical spine is discussed in a chapter here. There are chapters regarding the medical and surgical management of osteoporosis, vertebroplasty, and kyphoplasty in the section entitled Osteoporosis. The section on minimally invasive surgery was very interesting. The chapters in this section covered some of the newest techniques and approaches in spinal surgery. The illustration of how sequential dilators are used was clearly illustrated. Several nonfusion techniques are detailed in the subsequent chapters. Spinal imaging and spinal monitoring comprise the final 2 chapters.

One of the strengths of this text can be found in the suggested reading sections following each chapter. Here relevant references can be found as well as a quick summary of the value of the article or textbook. One of the weaknesses of this book was when outcomes were discussed. The majority of the outcomes mentioned were vague such as "a majority of patients do well." There was no mention of outcomes related to function, return to work, or disability status. Other outcomes mentioned dealt with complications from procedures such as fusions that develop pseudarthrosis. In general this book is written for physicians regarding the medical management of multiple spine problems. I would recommend this text to the physical therapist that treats a majority of spinal patients or practices in an acute care setting.

Jeff Yaver, PT

Hewitt TE, Schultz SJ, Griffin LY, eds. Understanding and Preventing Noncontact ACL Injuries. Champaign, Ill: Human Kinetics; 2007, 315 pp., illus.

Anterior cruciate ligament (ACL) noncontact injuries have been a rapidly evolving issue with numerous advances in the past 15 years. This is the first comprehensive text dedicated to the topic of noncontact ACL injuries. This text encompasses the breadth of current knowledge of noncontact ACL injuries. The contributors are leaders in the field of sports medicine with specific interests in ACL injuries. Include physicians, physical therapists, athletic trainers, and scientists.

There are 4 sections, including an introduction to understanding and preventing ACL injury. Each section is divided into chapters which relate directly to that topic. The introduction to each section includes a listing of key points, which is a good introduction to the chapters ahead. The book not only explains how ACL injuries occur but also provides information that can be used in making evidence-based decisions in clinical practice. The purpose of this book is to provide the most up-to-date research on how noncontact ACL injuries occurs, who is most at risk for these injuries and why female athletes suffer these injuries at a higher rate than males. The authors also discuss the efficacy of prevention programs. Lastly, the authors state they want to provide resources for athletic directors, coaches, parents, and athletes who would like to learn more about how to implement a prevention program in their school or sport.

The book contains 21 chapters and a detailed list of references. The text begins with an introduction to understanding and preventing ACL injury. The author gives important background information regarding ACL injuries and prevention programs which serves as the basis for the book. The author discusses issues that are not commonly talked about including the cost of ACL injuries, epidemiology of ACL injuries, as well as how Title IX has affected ACL injuries.

The first section deals with the synopsis of problems of ACL injuries. Discussions include incidence of ACL injury, costs associated with ACL injury, as well as if ACL reconstruction prevents articular degeneration.

Numerous key points are also detailed in each section which summarizes the chapter. Chapter 1 discusses the incidence of ACL injury. The authors do an adequate job of discussing incidence of ACL injuries, how they occur by gender and sport, but also give background info on basic statistical information which is key to understanding ACL injuries. A very detailed chart is discussed regarding incidence of ACL injury by different sports including soccer, basketball, team handball, and incidence of ACL injury in collision sports. The next chapter deals with ACL reconstruction and whether it prevents articular degeneration. There is an excellent discussion on the relationship and importance of the meniscus to ACL injuries as well as osteochondral pathology and articular cartilage in ACL injuries. The last chapter deals with the costs associated with ACL injury. The authors do an excellent job of describing how the costs affect our health care system in general and ways to educate the public on this problem.

The second section deals with ACL injury prevention programs. Chapter 4 discusses the components of prevention programs and goes into the history and previous studies of prevention programs with a detailed table. Each study is also described in detail and compared to each other. The next chapter deals with how proprioceptive training including plyometic training and biofeedback are used to influence ACL injury rates. The next 2 chapters deal with how specific training programs, including hamstring vs. quadriceps strength, can have an affect on ACL injury rates and how prevention programs affect performance. In my opinion, these are the best-detailed chapters of the text. The next chapter discusses research on risk factors and is a nice transition to the next section. The last part of this section discusses future research goals and the future direction of ACL research which is an excellent conclusion to this section.

The third section deals with Biomechanical and Neuromuscular Mechanisms of ACL Injuries. The first chapter of this section is quite interesting. It discuses biomechanics associated with injury and interviewed athletes to describe the event that occurred with the injury. The next 2 chapters evaluate risk factors on ACL injury including landing mechanics, cutting, and its effects on femoral and tibial rotation. It also discusses how neuromuscular firing occurs with landing mechanics and muscle firing patterns that can have an affect on ACL injury rates. A detailed discussion on muscle activation patterns was also noted. Chapters 15 and 16 change gears a little bit and discuss epidemiology and mechanisms of injury in alpine skiing, skating, and dance. The last chapter in this section discussed how biofeedback and neuromuscular control plays a role in ACL injury prevention.

The last section deals with Hormonal and Anatomic Risk Factors and Preventative Bracing for ACL injuries. Chapter 18 deals with ligament biology and its relationship to injury. Chapter 19 is one of the most detailed and comprehensive chapters of the text. It describes hormonal influences on ligament biology including how the menstrual cycle and sex hormones affect the mechanical properties of the knee. Chapter 20 discusses anatomic factors in ACL injury risk including notch size and width, generalized joint laxity, and anatomical alignment. The last chapter discusses functional bracing and if it can reduce ACL injury risk.

This is a very comprehensive text that is well organized and well written. The tables greatly enhance the text and make the information readily available. New research is constantly being produced and this text not only describes what the experts believe is the cause of noncontact ACL injures, but ways to prevent these injuries and future research that is evolving. The authors state that the target audience of this book is physicians, scientists, athletic trainers, physical therapists, clinicians, coaches, athletic directors, athletes, and their parents. This text makes very practical sense to the clinicians listed above, but may be too scientific for coaches, athletic directors, athletes, and parents. The strength of the text includes excellent detailed illustrations, historical information as well as up-to-date clinical information, and direction for future research. This makes this text very practical for the sports medicine physician, physical therapist, and athletic trainer.

David M. Nissenbaum, MPT, MA, LAT

Ross LM, Lamperti ED, Taub E, eds. Thieme Atlas of Anatomy: Head and Neuroanatomy. New York, NY: Thieme; 2007, 423 pp. illus.

The Thieme Atlas was designed to be as close to an ideal atlas of anatomy as possible, and input in its creation was solicited from students and lecturers alike. The atlas was originally written in German; the version reviewed here was translated into English and reviewed for accuracy by the editors listed above. The atlas has 2 foci: the head and the neuroanatomy.

As expected of an anatomy atlas, images dominate the pages. Those in this atlas are particularly large and detailed. This book itself is oversized at about 9 x 12 inches. Naturally then, the Table of Contents is really a table of images. The *Head* section of the atlas is divided into 10 subsections: Cranial Bones, Muscles of the Head, Blood Vessels of the Head and Neck, Cranial Nerves, Topographical Anatomy (which contains the superficial layers), Oral Cavity, Nose, Eye and Orbit, Ear and Vestibular Apparatus, and Sectional Anatomy of the Head. The second section, *Neuroanatomy*, contains 12 subsections: Introduction to Neuroanatomy, Meninges of the Brain and Spinal Cord, Ventricular System and Cerebrospinal Fluid, Telencephalon (Cerebrum), Diencephalon, Brainstem, Cerebellum, Blood Vessels of the Brain, Spinal Cord, Sectional Anatomy of the Brain, Autonomic Nervous System, and what the editors call Functional Systems. Under each subsection in the Table of Contents, the images are listed in order and labeled in good detail.

Accompanying each image/set of images is a descriptive text. Many images are also labeled. Augmenting the purely anatomical images are images with a more clinical focus and description, such as those of the dislocated temporomandibular joint, cerebellar lesions and their clinical signs, and pressure on spinal nerve roots from a herniated lumbar disk of L4/5.

Although the atlas is intended for students of anatomy, it is a wonderful reference book for anyone needing one of neuroanatomy. The atlas is extremely comprehensive regarding both the head and neuroanatomy, so individuals not interested in a detailed anatomy of the head including the teeth, oral cavity, and auricular canals may want to look for a different text. This atlas would be appropriate for multiple rehabilitation specialties: physical therapy, occupational therapy, and speech and language pathology.

Allyson Baughman, PT

Low Back Pain Paradigm Shift: A Treatment based Classification Approach and Introduction to Lumbopelvic Manipulation

Speaker: David Browder, DPT
Tuesday & Wednesday, February 5 & 6, 2008

Course Description: This evidence-based course is designed for any clinician that wants to improve their clinical decision making and manual therapy skills for treating patients with low back pain (LBP). Students will learn how to use current evidence to categorize patients with LBP into 1 of 4 treatment categories: manipulation & exercise, activities to promote centralization, stabilization exercises, or traction. Examination, decision making, and specific treatment approaches will be instructed. The evidence supporting this decision making approach and the various treatment options will be discussed in an interactive and fun environment. This is not a lecture only course. At least 50% of the course will be spent in lab and each participant will take home the ability to safely and effectively perform several 'high yield' high velocity low amplitude lumbopelvic manipulation techniques as advocated by the Manipulation Task Force. A comprehensive handbook and instructional DVD will be provided. (Limited enrollment!)

Essential Radiology in Physical Therapy: a Practical Course in Film Reading

Speaker: Ross Biederman, DPM—MD
Tuesday & Wednesday, February 5 & 6, 2008

Course Description: A clinically relevant hands-on course in plain film x-ray, MRI and CT film interpretation. The session will focus on enhancing film reading skills and integration of radiographic information into rehabilitation planning, modality selection and outcome assessment. Includes guided hands-on film reading practice of both x-ray and MRI films at view boxes.

Using Prefabricated Foot Orthoses in Clinical Practice: Current Evidence and Fabrication Principles

Speakers: Tom McPoil, PT, PhD, ATC;
Mark Cornwall, PT, PhD, CPed
Wednesday, February 6, 2008

Course Description: The purpose of this workshop is to present to the practicing physical therapist a review of the principles of foot orthotic prescription, including the role of subtalar joint neutral position, as well as the current evidence to support the use of both pre-fabricated and custom foot orthoses for motion control. The use of the "treatment direction test" to not only determine if foot orthotics are indicated, but to guide the prescription will also be discussed. Afternoon laboratory sessions will provide participants with "hands-on" experiences in modifying pre-fabricated foot orthoses and to practice performing the augmented low-Dye as well as the Reverse 6 anti-pronation taping techniques. (Limited enrollment!)

CO-SPONSORED COURSES

Clinical Residency 101: Getting Started and Doing it Well

Speakers: Carol M Davis, PT, EdD, MS, FAPTA;
Greg W Hartley, PT, MSPT, GCS;
Theresa Schuemann, PT, SCS, ATC, CSCS;
Patricia McCord, PT, FAAOMPT, OCS
Wednesday, February 6, 2008

Course Description: This workshop is ideal for individuals and organizations interested in developing a credentialed clinical residency. Learn about the process from individuals who have guided their clinical residency through a successful credentialing outcome and from presentatives of APTA's Committee on Residency Credentialing. Innovative ways to address the credentialing criteria will be explored to make a clinical residency fit your unique situation.

Pelvic Floor Physical Therapy for PTAs

Speakers: Beth Shelly, PT, BCIA-PDMB;
Patricia J. Jenkyns, PT
Wednesday, February 6, 2008

Course Description: This one day course will give the PTA a working knowledge of pelvic floor therapy including: bladder training, EMG biofeedback, and the coordination of the abdominals and pelvic floor. The course will also include a review of the anatomy of the pelvic floor, the physiology of micturition, and the types of urinary incontinence. Participants will have the opportunity to practice with EMG equipment and practice bladder training instruction.

Management of Lower Extremity Edema & Lymphedema

Speakers: Rose L Hamm, PT, DPT, CWS, FCCWS;
Lorraine Lovejoy-Evans, PT, DPT;
Marisa Perdomo, PT, MS, DPT

Tuesday & Wednesday, February 5 & 6, 2008

To register online visit
www.apta.org

CSM 2008 SCHEDULE

NASHVILLE, TN, FEBRUARY 6–10, 2008

We are only about 6 months away from CSM 2008 in Nashville - it is time to save the date! February 6 - 10, 2008 will find you at the new Gaylord Opryland Resort and Convention Center in Nashville enjoying the renovated hotel and convention spaces along with our renovated schedule of events.

Some of the changes to CSM include consistent beginning and ending times for all programming - allowing you to plan your convention experience a little easier. There will be a shorter opening program (2 hours) on professionalism and a new closing ceremony that is sure to keep you motivated and attentive all the way until the end of conference. The closing program is tentatively scheduled to be a comedy in medicine program with a raffle for free registration to CSM 2009.

Within the Orthopaedic Section's programming, we have also made some changes. You will see that we are co-sponsoring more programs with many of the other Sections. We have moved all platforms to Saturday afternoon allowing you to spend the afternoon attending talks on the latest research - switching to adjacent rooms as your interest dictates. We are also changing our business meeting and re-vamping our social scene. We will start with a "New Section Member/First-time Conference Attendee's" breakfast on Thursday morning. On Friday after the Rose platform, we will have cocktails and hors d'oeuvres from 5:00 – 6:00 PM followed by our new abbreviated business meeting/reception. Our Awards Ceremony will take place immediately after the business meeting, and coffee and dessert will be served after the awards have been presented. Friday evening will definitely be hopping with all of this activity!

So save the date! Just take a sneak peak at some of the programming we will be offering and I am sure you will agree, Nashville is **THE** place to be in February, 2008!

Beth Jones, PT, DPT, MS, OCS
Education Program Chair

TUESDAY, FEBRUARY 5, 2008

Pre-conferences:

8:00 AM – 5:00 PM

Low Back Pain Paradigm Shift: A Treatment Based Classification Approach and Introduction to Lumbopelvic Manipulation (2-day course)

8:00 AM – 5:00 PM

Essential Radiology in Physical Therapy: A Practical Course in Film Reading (2-day course)

WEDNESDAY, FEBRUARY 6, 2008

Preconferences:

8:00 AM – 5:00 PM

Low Back Pain Paradigm Shift: A Treatment Based Classification Approach and Introduction to Lumbopelvic Manipulation (second day of 2-day course)

8:00 AM – 5:00 PM

Essential Radiology in Physical Therapy: A Practical Course in Film Reading (second day of 2-day course)

8:00 AM – 5:00 PM

Using Prefabricated Foot Orthoses in Clinical Practice: Current Evidence and Fabrication Principles (1-day course)

THURSDAY, FEBRUARY 7, 2008

7:00 AM – 8:00 AM

"New Section Member/First-time Conference Attendee's" Breakfast

Programming:

8:00 AM – 10:00 AM

Multi-Section Program

10:30 AM – 12:30 PM

The Biomechanics and Muscle Physiology of Knee Rehabilitation Exercises

10:30 AM – 12:30 PM

Manual Physical Therapy and the Current State of Musculoskeletal Care in the US: Feast or Famine?

10:30 AM – 12:30 PM

Clinical Reasoning in the 21st Century: Implications of Biopsychosocial Models for the Clinician, Educator, and Researcher

10:30 AM – 12:30 PM

Evidence-based Approach to Rehabilitation Following Reverse Total Shoulder Arthroplasty

1:00 PM – 4:00 PM
Classification of Patients with Neck Pain: The Next Frontier

1:00 PM – 4:00 PM
Current Concepts Related to Motor Control Training and Rehabilitative Ultrasound Imaging for Patients with Lumbopelvic Disorders *(co-sponsorship with the Section on Women's Health)*

1:00 PM – 3:00 PM
Evidence-based Prevention and Treatment of Lower Extremity Stress Fractures *(co-sponsorship with the Federal Affairs Section)*

1:00 PM – 4:00 PM
The Relative Practitioner
(co-sponsorship with the Education Section)

1:00 PM – 4:00 PM
Rapid Recovery is a Team Effort: Examining the Individual and Collaborative Roles of the Surgeons, Clinician, Patient, and Researcher on the Journey to Successful Patient Outcomes *(co-sponsorship with the Acute Care Section)*

FRIDAY, FEBRUARY 8, 2008

Business Meetings:

7:00 AM – 8:00 AM
Occupational Health PT SIG Business Meeting

7:00 AM – 8:00 AM
Performing Arts SIG Business Meeting

7:00 AM – 8:00 AM
Animal SIG Business Meeting

Programming:

8:00 AM – 10:00 AM
Use of the International Classification of Functioning to Develop Evidence-based Practice Guidelines for Common Musculoskeletal Conditions: A Progress Update

8:00 AM – 11:00 AM
Occupational Health PT Special Interest Group Programming – Manual Therapy for the Upper Extremity "-itis"

8:00 AM – 11:00 AM
Performing Arts Special Interest Group Programming – Evaluation and Treatment of Cervicothoracic Pain and Dysfunction: Freeing the Performing Artist to Reach New Heights

8:00 AM – 11:00 AM
Animal PT Special Interest Group Programming – Doing the Dog Paddle: Comparative Aquatic Physical Therapy in Human, Canine, and Equine Rehabilitation *(co-sponsorship with the Aquatic Physical Therapy Section)*

1:00 PM – 3:00 PM
Research Information Exchange Center *(co-sponsorship with the Section on Research)*

1:00 PM – 4:00 PM
Screening for the Lower Quarter: Structural Differentiation Diagnosis of the Lumbar Spine, Hip and Pelvis

1:00 PM – 4:00 PM
Integrated Control of Stability and Movement: Stability Control for Dynamic Movements *(co-sponsorship with the Neurology Section)*

1:00 PM – 4:00 PM
Don't be Afraid of Treating the Male Pelvic Floor *(co-sponsorship with the Section on Women's Health)*

4:00 PM – 5:00 PM
Rose Award Platform Presentation

5:00 PM – 7:00 PM
Orthopaedic Section Reception/Business Meeting

7:00 PM – 9:00 PM
Orthopaedic Section Awards Ceremony

SATURDAY, FEBRUARY 9, 2008

Business Meetings:

7:00 AM – 8:00 AM
Pain Management SIG Business Meeting

7:00 AM – 8:00 AM
Foot & Ankle SIG Business Meeting

7:00 AM – 8:00 AM
Organizational Meeting:
Proposed Musculoskeletal Imaging Educational Group Meeting

Programming:

8:00 AM – 11:00 AM
Pain Management Special Interest Group Programming – Physiology and Current Medical and Rehabilitative Management of Complex Regional Pain Syndrome

8:00 AM – 11:00 AM
Foot & Ankle Special Interest Group Programming – Foot and Ankle Tendinopathies: From Mechanisms to Interventions

1:00 PM – 3:00 PM
Platform Presentations
4 Concurrent Sessions: Spine I, Hip/Knee I, Shoulder, Occupational Health/Performing Arts

3:00 PM – 5:00 PM
Platform Presentations
4 Concurrent Sessions: Spine II, Hip/Knee II, Shoulder/Elbow, Foot & Ankle

5:00 PM – 6:00 PM
Combined Section (Closing) Programming

PLATFORM PRESENTATIONS

SATURDAY, FEBRUARY 9, 2008

PLATFORM SESSION I—SPINE I
1:00 PM – 3:00 PM

1:00 – 1:15 PM

Systematic Review of Tests to Identify the Disc, SIJ or Facet Joint as the Source of Low Back Pain
Jane Latimer, PhD, BAppSc (Phty)

1:15 – 1:30

Fear Predicts Peak Pain in Acute Onset Muscular Low Back Pain
Mark Bishop, PT

1:30 – 1:45

Interaction between Kinesophobia and Pain Amplification in Acute Back Pain
Mark Bishop, PT

1:45 – 2:00

Associations of Back and Leg Pain with Health Status and Functional Capacity of Older Adults: Findings from the Retirement Community Back Pain Study
Gregory Hicks, PT, PhD

2:00 – 2:15

Behavioral Interventions for Sub-acute Low Back Pain
Steven George, PT, PhD

2:14 – 2:30

Treatment Effects of Spinal Manipulation on Trunk Proprioception in Subjects with Chronic Low Back Pain during Symptom Remission
Kenneth Learman, PhD

2:30 – 2:45

The Effect of Subject Expectation on Spinal Manipulation Induced Hypoalgesia
Joel Bialosky, PT, OCS

2:45 – 3:00

Immediate Effects of Spinal Manipulative Therapy in Subjects With Low Back Pain: A Pilot Study
Joel Bialosky, PT, OCS

PLATFORM SESSION II—HIP/KNEE II
1:00 – 3:00 PM

1:00 – 1:15

The Relationship between Functional Outcome Measures and Radiographic Severity in Patients with Osteoarthritis at the Knee
Gary Lentell, PT

1:15 – 1:30

Development of a Clinical Prediction Rule for Diagnosing Hip Osteoarthritis in Patients with Unilateral Hip Pain
Thomas Sutlive, PT, PhD

1:30 – 1:45

Functional Performance Plateaus and Quadriceps Begins to Decline 2 Years after Unilateral Total Knee Arthroplasty
Sara Farquhar, MPT

1:45 – 2:00

The Role of the Hip during a Sit-to-Stand task in Individuals Three Months After Unilateral Total Knee Arthroplasty
Sara Farquhar, MPT

2:00 – 2:15

Declines in Contralateral Limb Quadriceps Strength and Activation after Total Knee Arthroplasty
Stephanie Petterson

2:15 – 2:30

Comparison of Hip Kinematics, Hip Muscle Strength and Hip Muscle Activation between Females with Patellofemoral Pain and Healthy Controls
Richard Souza, MPT, ATC

2:30 – 2:45

Comparison of Quadriceps Muscle Volume in Females With and Without Patellofemoral Pain
Yu-Jen Chen, PT, MS

2:45 – 3:00

Frontal and Transverse Plane Hip Kinematics during Level Walking, Stair Ascent and Descent in Individuals with Patellofemoral Pain Compared to Pain-free Control Subjects
Gretchen Salsich, PT, PhD

PLATFORM SESSION III— SHOULDER
1:00 – 3:00 PM

1:00 – 1:15

Comparison of Two Interventions to Increase Use of Outcome Measures in Clinical Practice
Joy MacDermid, BSCPT, PhD

1:15 – 1:30

Diagnostic Accuracy and Reliability of Subacromial Impingement Tests
Lori Michener, PT, PhD, ATC, SCS

1:30 – 1:45

Validation of a Measure of Voluntary Activation for the Infraspinatus During Isometric Shoulder External Rotation
Scott Stackhouse, PT, PhD

1:45 – 2:00

Rotator Cuff Repair: The Effect of a Standardized Post-Operative Physical Therapy Protocol versus a Non-Standardized Post-Operative Protocol
David Milroy, PT, MS

2:00 – 2:15

Measuring Health Status in Patients with Shoulder Disorders
Brian Leggin, PT, DPT, OCS

2:15 – 2:30

Clinical Outcomes and Utilization of Physical Therapy Services for Categories of Shoulder Pathologies Treated Conservatively
Eric Parent, PT, MSc, PhD

2:30 – 2:45

Clinical Outcomes and Utilization of Physical Therapy Services of Patients Related to Categories of Shoulder Surgeries
Gerard Brennan, PT, PhD

2:45 – 3:00

The Relationship of Physical Impairment, Pain, and Kinesophobia to Disability in Patients with Shoulder Pathology
Trevor Lentz, MPT

PLATFORM SESSION IV—PERFORMING ARTS/OCC. MED/OTHER
1:00 – 3:00 PM

1:00 – 1:15

Reliability and Validity of Functional Ankle Range of Motion Measurements in Dancers
Kendra Hollman, PT

1:15 – 1:30

Reliability, Validity, and Interpretation of a New Way to Measure Ankle Dorsiflexion
Danelle Dickson, PT

1:30 – 1:45

Core and Shoulder Girdle Muscle Activation during Plank and Hundred Exercises on the Pilates Reformer and Mat
Craig Ruby, PT

1:45 – 2:00

A Comparison of Pelvic and Shoulder Girdle Activation between Experienced and Novice Pilates Participants during Plank and Hundred Exercises on the Pilates Reformer and Mat
Craig Ruby, PT

2:00 – 2:15

A Measurement System for Lumbar Extension Strength
Jim Simpson, PT, Med

2:15 – 2:30

Treatment of an Individual with Piriformis Syndrome Focusing on Hip Muscle Strengthening and Movement Re-education: A Case Report
Steven Yun, MPT, OCS

2:30 – 2:45

Management of a Patient with Bilateral Knee Multiligament Involvement
Laura Schmitt, DPT, SCS, OCS

2:45 – 3:00

Force Myography: A Novel Means to Characterize Muscle Activity during Functional Tasks
J Bradley Barr, DPT, OCS

PLATFORM SESSION V—SPINE II
3:00 – 5:00 PM

3:00 – 3:15

A Case Series: Were Compressive Neuropathies a Result of Conservative Musculoskeletal Intervention?
Gregory Paul Ernst, PT, PhD, SCS

3:15 – 3:30

Prognostic Factors after Acute Whiplash Injury: Results of a Meta-analysis
Dave Walton, PT, PhD

3:30 – 3:45

Effects of Biofeedback on Stress-evoked Activation of the Upper Trapezius Muscle in Subjects with Chronic Neck Pain
Katrina Shaun Maluf, PT, PhD

3:45 – 4:00

Are we Getting Cervical Lesions better in a Private Practice?
Tim Uhl, PT, PhD, ATC

4:00 – 4:15

Imaging Findings Associated with Outcome in Patients with Neck Pain
Brian J. Rodriguez, PT, OCS

4:15 – 4:30

Conservative Treatment of Cervical Radiculopathy: A Case Series
Ian Avery Young, PT, MS, OCS, SCS

4:30 – 4:45

Predictors of Short-term Outcome in Patients with Cervical Radiculopathy
Josh Alan Cleland, PT, DPT, PhD, OCS, FAAOMPT

4:45 – 5:00

A Clinical Prediction Rule for Classifying Patients with Neck Pain who Demonstrate Short-term Improvement with Cervical Traction and Exercise
Nicole H. Raney, PT, DSc, OCS

PLATFORM SESSION VI—HIP/KNEE II
3:00 – 5:00 PM

3:00 – 3:15

The Effect of Skin Thickness and Time in the Absorption of Dexamethasone Sodium Phosphate in Human Connective Tissue Using Iontophoresis
Alfred Burke Gurney, PT, OCS

3:15 – 3:30

Do Early Eccentrically-induced Muscle Size and Functional Improvements Persist Following Anterior Cruciate Ligament Reconstruction? A Follow-up Study
John Gerber, PT, MS, SCS

3:30 – 3:45

Clinical Predictors of Knee Flexion Angle during a Single Leg Squat
Andrew Samir Morcos, PT

3:45 – 4:00

Support Moment Changes Following ACL Reconstruction: Comparative Study
Ahmed Radwan, PT

4:00 – 4:15

Identification of Abnormal Hip Motion Associated with Acetabular Labral Pathology: A Case Report
Andrea Brennglass, DPT

4:15 – 4:30

The Response of Diagnostic Intraarticular Hip Injection for Individuals with an Acetabular Labral Tear
Rob Roy Lee Martin, PT

4:30 – 4:45

Diagnostic Accuracy of Symptoms and Exam Findings in Determining Response to Anesthetic Intraarticular Injection in Individuals with Acetabular Labral Tears
Rob Roy Lee Martin, PT

4:45 – 5:00

Inter-rater Reliability of a Clinical Scale to Assess Knee Joint Effusion
Lynne Patterson Sturgill, PT, MHS, OCS

PLATFORM SESSION VII—OTHER/SPINE II
3:00 – 5:00 PM

3:00 – 3:15

Is There a Sub-group of Patients with Low Back Pain Likely to Benefit from Mechanical Traction? Results of a Randomized Clinical Trial and Sub-grouping Analysis
Julie M Fritz, PT, PhD, ATC

3:15 – 3:30

Association between Guideline-Adherent Physical Therapy Care and Subsequent Healthcare Costs for Patients with Acute Low Back Pain
Julie M Fritz, PT, PhD, ATC

3:30 – 3:45

Use of Treatment-Based Classification Groups Produces Significant Outcomes in Patients with LBP
Daphne R Scott, PT, MS, OCS

3:45 – 4:00

The Effect of Spinal Stabilization Training on Temporal and Spatial Parameters of Gait in Individuals with Lower Extremity Amputations
Frances Corio, PT, MA, OCS

4:00 – 4:15

Changes in Muscle Thickness of Select Trunk Muscles following a Lumbar Stabilization Program
Kyle B Kiesel, PT

4:15 – 4:30

The Relationship of Multifidus CSA with Age, Gender, Percent Body Fat, and BMI in Healthy Subjects
Todd A. Watson, PT, DPT, OCS, FAAOMPT

4:30 – 4:45

Lateral Abdominal Muscle Behavior in Subjects with Lumbopelvic Pain during the Active Straight Leg Raise Test
Deydre Smyth Teyhen, PT, PhD, OCS

4:45 – 5:00

Lateral Abdominal Muscle Behavior in Subjects with Lumbopelvic Pain during the Abdominal Drawing-in Maneuver
Deydre Smyth Teyhen, PT, PhD, OCS

PLATFORM SESSION VIII—FOOT & ANKLE
3:00 – 5:00 PM

3:00 – 3:15

Sensitivity and Specificity of Plantar Pressure Threshold in Neuropathic Mid Foot Ulcers
David Sinacore, PT, PhD, FAPTA

3:15 – 3:30

Effects of a 4 Week, Unilateral Neuromuscular Control Training Program on Bilateral Lower Extremity Postural Control and Function in Subjects with Chronic Ankle Instability
Tamara Helton, PT

3:30 – 3:45

Exam Factors Identifying Patients Status-Post Inversion Ankle Sprain Who are Likely to Benefit from Manual Physical Therapy Interventions and Exercise
Julie Marie Whitman, PT, DSc, OCS, FAAOMPT

3:45 – 4:00

Uncovering Mechanisms Underlying the Effectiveness of Shoe Inserts in Patients with Midfoot Arthritis
Smita Rao, SPT

4:00 – 4:15

Comparison of the Clinical Heel Rise Test in Subjects with Stage II PTTD and Healthy Controls
Christopher Glenn Neville, PT

4:15 – 4:30

The Influence of Foot Orthotic Use on Exercise Related Leg Pain in Cross Country Athletes
Ann Marcolina Hayes, PT, MHS, OCS

4:30 – 4:45

Foot Position Affects Weight-bearing Ankle Dorsiflexion Measures in Individuals with Plantar Fasciitis
Shane McClinton, PT, DPT, CSCS

4:45 – 5:00

The Effects of Cam Boot Pressures during Gait
Robert C Manske, PT, DPT, MEd, SCS

FALL BOARD OF DIRECTORS MEETING MINUTES

PITTSBURGH, PA • OCTOBER 11—13, 2007

James Irrgang, President, called a regular meeting of the Board of Directors of the Orthopaedic Section, APTA, Inc. to order at 8:00 AM Eastern Time on Thursday, October 11, 2007.

Present:
James Irrgang, President
Tom McPoil, Vice President
Joe Godges, Treasurer
Bill O'Grady, Director
Ellen Hamilton, Director
Adam Smith, Membership Chair
James Spencer, Incoming Membership Chair
Beth Jones, Education Chair
Chris Hughes, OP & ISC Editor
Lori Michener, Research Chair
Tara Jo Manal, Finance Committee Member
Steve Clark, Finance Committee Member
Bob Rowe, Practice Chair
Carrie Adamson Adrienne, APSIG Vice President

Steve McDavitt, APTA Liaison
John Barnes, APTA CEO, Special Guest
Tara Fredrickson, Executive Associate
Terri DeFlorian, Executive Director

Absent:
Kyndy Boyle, Nominating Chair

The meeting agenda was approved with one addition.

The September 20, 2007 Board of Directors conference call minutes were approved as written.

The date and time of the November Board of Directors conference call meeting was set for Tuesday, November 13, 2007 at 2:30 EST.

The date and time of the December Board of Directors conference call meeting was set for Tuesday, December 11, 2007 at 2:30 PM EST.

John Barnes, CEO, APTA, presented the new APTA Headquarters Organizational Chart.

=MOTION 1= Ms. Hamilton moved to approve the ICF guidelines on plantar fasciitis. ADOPTED (unanimous)
Fiscal Implication: None.

=MOTION 2= Mr. McPoil moved to appoint, for a 3 year term, an ICF Coordinator to develop, define content, review, finalize, and update ICF related practice guidelines for musculoskeletal conditions. ADOPTED (unanimous)
Fiscal Implication: To be determined.

=MOTION 3= Mr. McPoil, Vice President, moved that the Orthopaedic Section Board of Directors approve an honorarium for the ICF Coordinator/Editor position at $1,500 per completed guideline. ADOPTED (unanimous)
Fiscal Implication: $1,500 per guideline. Recommended honorarium for 2008 is $6,000.

=MOTION 4= Ms. Hamilton moved to create a Residency and Fellowship Education Coordinator position, for a 3 year term, for the purpose of developing and implementing Orthopaedic Section Residency and Fellowship education materials. ADOPTED (unanimous)

The Board of Directors reviewed and listed updates to the 2007-2010 Strategic Plan (see attached strategic plan).

=MOTION 5= Ms. Michener moved that the Orthopaedic Section Board of Directors approve the changes made to the Research Grant Award. ADOPTED (James – for, Tom – for, Joe – for, Ellen – for, Bill – not present) (See attached award for changes made)
Fiscal Implication: $75,000 (increased from $30,000)

=MOTION 6= Ms. Adrian, Vice President, APTSIG, moved that the Orthopaedic Section Board of Directors approve the Animal PT SIG utilizing approximately $9,000 from the SIG encumbered funds for producing a canine rehabilitation clipboard. These clipboards will potentially be sold by the SIG at CSM and veterinary/animal rehabilitation meetings. Costs are as follows:
250 wire clip boards @ 13.95 each = $3487.50
250 calculator clip boards @ 15.95 each = $3987.50
Screen charges = approx. 150.00
Artwork charges = approx. $500.00 to $1000.00
Shipping charges = approx. $250.00
TABLED
Fiscal Implication: $9,000 (actual $8735) to be taken from encumbered funds.

Steve McDavitt, APTA Board Liaison, gave an update on the APTA Physical Therapy Branding Task Force.

FALL BOARD OF DIRECTORS MEETING MINUTES

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The Board of Directors discussed the following Finance Committee recommendations:

- Explore OP online option for members to reduce printing and postage costs.
  An online option is currently being offered on the Section's web site. The Section office will investigate using the OP web page within the Section's web site to link to advertisers. This will be included in a blast e-mail survey to Section members.
- Inform members of the initiatives (potential members) of belonging to the Section to increase membership. Recommend this be an outcome of the Fall Board of Directors meeting in October 2007, such as spotlighting recipients who have received funding from the Section and what the outcome of that was, progress made with the ICF project, support for the Foundation, expansion of the small grants program for clinical research, progress with the residencies and curriculum task force, and 2009 annual meeting.
  This item will be included on the To Be Completed Items list.
- Explore the partnership program APTA has and see if the Section wants to create one. Recommend Membership Committee gather information from APTA web site.
  =MOTION 7= Mr. McPoil moved that the Orthopaedic Section Board of Directors implement an International Partners Program. ADOPTED (James – for, Tom – for, Joe – for, Ellen – for, Bill not present)
  Fiscal Implication: None.
- The Finance Committee reviewed the Section's 2006 audit and recommends that the Board accept the document.
  =MOTION 8= Mr. Godges moved that the Orthopaedic Section Board of Directors accept the 2006 audit. ADOPTED (unanimous)
  Fiscal Implication: None.
- The Finance Committee does not recommend a dues increase at this time.
  =MOTION 9= Mr. Godges moved that the Orthopaedic Section Board of Directors not increase Section dues at this time. ADOPTED (unanimous)
  Fiscal Implication: None.
- The Finance Committee recommends the Board of Directors approve the updated Finance Committee policies.
  =MOTION 10= Mr. Godges moved that the Orthopaedic Section Board of Directors approve the updated Finance Committee Policies and cover page. ADOPTED (unanimous)
  Fiscal Implication: None.
- The Finance Committee recommends the Board of Directors approve a donation to the Foundation for Physical Therapy totaling $500,000 over the next 7 years with the stipulation this money would be used for Orthopaedic research.
  =MOTION 11= Mr. Irrgang moved that the Orthopaedic Section Board of Directors approve a $150,000 donation to the Foundation for Physical Therapy in 2007 and $50,000 each year for the next 7 years (2014). The $50,000 would be given in 2 payments per year. The total given to equal $500,000 with the stipulation this money would be used for Orthopaedic research. ADOPTED AS AMENDED (James – for, Tom – for, Joe – abstained, Bill – for, Ellen – for)
  =MOTION 12= Mr. Irrgang moved to amend MOTION 10 to add the following at the end of the motion - Upon Board approval a contract will be negotiated stipulating that if the Section risks dropping our reserve fund below 40% of our operating budget a donation may not be given for that year. ADOPTED (James – for, Tom – for, Joe – abstained, Bill – for, Ellen – for)
  Fiscal Implication: Maximum of $500,000 over 8 years.

=MOTION 13= Mr. Godges moved that the Orthopaedic Section Board of Directors approve paying an honorarium to the Vice President in the amount of $6,000 beginning in 2008. ADOPTED (James – for, Tom – recused himself, Joe – for, Bill – for, Ellen - for)
Fiscal Implication: $6,000 for 2008.

=MOTION 14= Mr. Irrgang moved that the Orthopaedic Section Board of Directors approve using the following calculation based on Finance Committee Policies for staff bonuses: total revenue ($1,540,933.00) from the unrestricted net assets less the administrative expenses ($224,478.00) and program expenses ($912,392.00) for the 2006 calendar year = $404,063.00. ADOPTED (unanimous)

=MOTION 15= Ms. Hamilton moved that the Orthopaedic Section Board of Directors approve the 2008 budget as presented by the Finance Committee. ADOPTED (James – for, Tom – for, Joe – for, Bill – absent, Ellen - for)

=MOTION 16= Ms. Hamilton, Director, moved that the Orthopaedic Section Board of Directors appoint Joe Godges to replace James Irrgang as a director on the JOSPT Board of Directors beginning at CSM 2008. ADOPTED (James – for, Tom – for, Joe - abstained, Bill – absent, Ellen - for)

=MOTION 17= Mr. Rowe, Practice Chair, moved that the Orthopaedic Section Board of Directors approve the Practice

FALL BOARD OF DIRECTORS MEETING MINUTES

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policies and cover page as presented. TABLED

=MOTION 18= Ms. Jones, Education Chair, moved that the Orthopaedic Section Board of Directors approve the Education policies and cover page as presented. TABLED

=MOTION 19= Mr. McPoil, Vice President, moved that the Orthopaedic Section Board of Directors approve an increase in the OPTP Editor honorarium from $1,000 per issue to $1,500 per issue beginning retrospectively to the new contract, February 2007 - 2010. The contract for the OPTP Editor will be revised to reflect this change. ADOPTED (James – for, Tom – for, Joe – for, Bill – absent, Ellen - for)

=MOTION 20= Mr. McPoil, Vice President, moved that the Orthopaedic Section Board of Directors approve reappointing Chris Hughes to a second year term as OPTP Editor. ADOPTED (James – for, Tom – for, Joe – for, Bill – absent, Ellen – for)

=MOTION 21= Mr. McPoil, Vice President, moved that the Orthopaedic Section Board of Directors adopt the Journal/ Newsletter policies and cover page. ADOPTED (James – for, Tom – for, Joe – for, Bill – absent, Ellen – for)

=MOTION 22= Ms. Hamilton, Director, moved to adopt the Nominating Committee policies and cover page. ADOPTED (James – for, Tom – for, Joe – for, Bill – absent, Ellen – for)

=MOTION 23= Mr. McPoil, Vice President, moved to have James Irrgang serve on the APTA Outcomes Data Collection Advisory Group. ADOPTED (James – abstained, Tom –for, Joe – for, Bill – absent, Ellen – for)

The Board of Directors agreed unanimously to support the following candidates for APTA office - Connie Hauser for Treasurer, Paul Rocker for Director, and Shawne Soper for Speaker of the House. James Irrgang will submit NC-1 forms to APTA on behalf of the Section. The deadline for submission is November 1, 2007.

The Board of Directors agreed that individuals interested in being appointed to an APTA Appointed Group will be directed to go to the APTA web site to fill out the form. The deadline for submission is January 1, 2008.

The Board of Directors discussed the 2009 Strategic Planning Meeting to be held in La Crosse the second week-end of October. A contract with the hotel has been secured for a room block. Beginning at CSM 2009 data will start being collected in preparation for this meeting.

The Board of Directors discussed the APTA Candidate Party and agreed not to contribute to the party in 2008.

The Board of Directors discussed the possibility of creating a President Elect Position. The decision was made not to create this new position but instead have the Board initiate a bylaw change to stagger the Vice President and President elections so each is elected in different years.

=MOTION 24= Ms. Hamilton, Director, moved that the Orthopaedic Section Board of Directors initiate the process to amend the Section bylaws to reflect a new election cycle to allow the President and Vice President to have staggered terms. ADOPTED (James – for, Tom – for, Joe – for, Bill – absent, Ellen - for)

Terri DeFlorian gave an update on one of the tenant's desire to acquire more lease space (Galileo). The Board of Directors charged Terri to contact Galileo with several options. The Board is willing to: negotiate a lower rent if Galileo agrees to a long term lease and add all of RSVP's current space; and, the Board would entertain any other options they may have.

The Board of Directors discussed having a face-to-face meeting at Annual Conference in 2008 in San Antonio, TX. Dates and times considered were Friday the 13th in the evening and Saturday the 14th all day. This would allow members to arrive on Friday and depart on Sunday. This will be discussed again at CSM in 2008.

The Board of Directors discussed holding their 2008 Fall Meeting in Flagstaff, AZ the second week in October. Arrival would be on Wednesday with the meeting Thursday, Friday, and half a day Saturday. Departure would be Saturday afternoon. This will be discussed again at the CSM 2008 Board meeting.

The Board of Directors meeting adjourned at 11:30 AM EST on Saturday, October 13, 2007.

Submitted by Terri A. DeFlorian, Executive Director

Congratulations Newly Orthopaedic Certified Specialists! All 542 of You!

Ereinee Abdelmalek, PT, OCS
Kevin L. Abers, PT, OCS
Sarah H. Abilleira, PT, OCS
Bart Abriol, PT, MPT, OCS
Michael Agnone, PT, MS, OCS
Karen A. Agostinucci, PT, OCS
Jerasimos Agrapidis, PT, MEd, OCS
Morton J. Aime, PT, GCS, OCS
Christy S. Allwein, PT, OCS
Gregory A. Almeter, PT, OCS
Timothy Ames, PT, MHS, OCS
Jason C. Amrich, PT, OCS
Stephanie Amspaugh, PT, DPT, OCS
Eric Anderson, PT, MPT, OCS
John M. Andraka, PT, DPT, OCS
Deborah R. Andras, PT, OCS
Michael L. Appell, PT, OCS
Nicole Armbrust, PT, OCS
J.M. Armendinger, PT, OCS
Geoffrey Armstrong, PT, OCS
Cory A. Ash, PT, MPT, OCS
Robert Askins, PT, MPT, OCS
Tina L. Avelar, PT, MPT, OCS
Luz A. Ayalde, PT, OCS
Jon W. Baldwin, PT, OCS
Kristopher G. Balgaard, PT, OCS
Marie J. Barron, PT, OCS
Vincent J. Barry, PT, DPT, OCS
Kelly Bartleson, PT, MPT, OCS
Francesca Barton, PT, MSPT, OCS
Ritudeep K. Basra, PT, OCS
Kimberly Baubles, PT, MSPT, OCS
Mark H. Baughman, PT, MPT, OCS
Sheila J. Bauza, PT, OCS
Jeffrey N. Bays, PT, MSPT, OCS
Nathanial J. Beach, PT, OCS
Michael V. Bean, PT, OCS
Juan C. Bedoya, PT, OCS
Karen E. Beernink, PT, OCS
Nazly Behnia, PT, DPT, OCS
Lauren Bellows, PT, MSPT, OCS
Cheryl Beloro, PT, DPT, OCS
Robert Benson, II, PT, MSPT, OCS
Julie A. Bergmann, PT, OCS
Karl W. Bergmann, PT, OCS
Leena T. Bhat, PT, OCS
Michael T. Bitzer, PT, OCS
Brian L. Blackwell, PT, OCS
Ian D. Blake, PT, MPT, OCS
Darren J. Bloebaum, PT, OCS
Sandra Boctor, PT, OCS
Charlie C. Boeyink, PT, OCS
Gregory Bonomo, PT, DPT, OCS
Laura A. Bonsness, PT, MPT, OCS
Gregory J. Booth, PT, OCS
Nicole Borman, PT, MSPT, OCS
Hunter L. Bowie, PT, OCS
Matthew R. Breton, PT, OCS
Renee L. Brinker, PT, OCS
Heather Broglio, PT, OCS
Melissa Buchholz, PT, MPT, OCS
Robert Burgess, PT, MSM, OCS
Kenneth Burns, II, PT, OCS
David V. Busam, PT, OCS
Mark R. Bussell, PT, OCS
Elizabeth M. Byrne, PT, OCS
Matthew Callahan, PT, MPT, OCS
Daniel Calvo, PT, MPT, OCS
Nancy Capparelli, PT, MSPT, OCS
Matthew J. Carbone, PT, MS, OCS
Joseph K. Cassata, PT, OCS
Michele Cazares, PT, DPT, OCS
Whitney A. Chambers, PT, OCS
John Chao, PT, DPT, OCS
Curt I. Cheslog, PT, MSPT, OCS
Michael Sungsuh Chon, PT, OCS
Douglas J. Chong, PT, MPT, OCS
MaryJane M. Ciacico, PT, OCS
Brad M. Ciccolella, PT, MPT, OCS
Jeffrey D. Clark, PT, MBA, OCS
Niki L. Coaster, PT, MSPT, OCS
Barbara J. Coe, PT, OCS
Quintin L. Cole, PT, OCS
Thomas M. Collins, PT, OCS
Robert A. Coltman, PT, MPT, OCS
Mark E. Conley, PT, MSPT, OCS
Andrew J. Connolly, PT, OCS
William Connor, PT, DPT, OCS
Daya P. Constance, PT, MSPT, OCS
Bradley D. Cooper, PT, DPT, OCS
Scott W. Copeland, PT, DPT, OCS
Ryan A. Cotton, PT, DHS, OCS
Zachary K. Couch, PT, MPT, OCS
Jeffrey Cowen, PT, MS, OCS
Daniel A. Craine, PT, OCS
Shawna F. Crescenzo, PT, OCS
Kenneth F. Crinklaw, PT, OCS
Dominic D. Crock, PT, DPT, OCS
Maria A. Crosby, PT, OCS
Robert B. Dale, PT, PhD, SCS, OCS
Aimee J. Dallaire, PT, MSPT, OCS
Valerie K. Damlos, PT, OCS
Sibi Daniel, PT, MPT, OCS
Susan M. Daugherty, PT, OCS
Justin W. Daughtry, PT, MPT, OCS
Joseph M. Day, PT, OCS
Scott R. Day, PT, MPT, OCS
Jeffrey T. De Bellis, PT, MS, OCS
Belinda DeFelice, PT, MPT, OCS
Sean E. Deardorff, PT, OCS
Lisa M. DeCoste, PT, OCS
Jennifer M. DeMink, PT, DPT, OCS
Bryan S. Dennison, PT, OCS
Jodi E. DeVincentis, PT, OCS
Suzanne M. DeWilde, PT, OCS
Allen J. DeWit, PT, DPT, OCS
Sandhya Dharmadas, PT, OCS
Anne N. Diedrich, PT, DPT, OCS
Antonio Dimaano, Jr., PT, MPT, OCS
John C. Dodd, PT, MSPT, OCS
Janet P. Dolot, PT, OCS
Jennifer Donovan, PT, PhD, OCS
Allison F. Dorfman, PT, OCS
Jukey L. Dotson, PT, MSPT, OCS
Megan C. Douglas, PT, MPT, OCS
Ami Doyle, PT, MPT, OCS
Carrie L. Dreyer, PT, DPT, OCS
Jason P. Dudzic, PT, MS, OCS
Todd J. Duncan, PT, OCS
Carolyn A. Duncanson, PT, OCS
Gregory E. Dunn, PT, MSPT, OCS
Brigid M. Dunne, PT, DPT, OCS
Jan W. Durst, PT, DPT, OCS
Corrine D. Dutto, PT, MS, OCS
George Dyriw, PT, DPT, OCS
Lisa M. Eaton, PT, DPT, OCS
Samuel L. Echols, PT, OCS
Melissa Eden, PT, DPT, OCS
James M. Elliott, PT, DPT, OCS
Boyd A. Etter, PT, OCS
Todd S. Everett, PT, OCS
Lisa A. Fairchild, PT, MPT, OCS
Cesar B. Fajardo, PT, OCS
Elizabeth M. Falcone, PT, DPT, OCS
Michael W. Fay, PT, OCS
Courtney D. Few, PT, MPT, OCS
Roy J. Film, PT, MPT, OCS
Michael L. Fink, PT, DSc, SCS, OCS
Michelle Finnegan, PT, MPT, OCS
Mary I. Fisher, PT, MSPT, OCS
Holly A. Fitzgerald, PT, OCS
Stacey L. Flaming, PT, OCS
Tracey M. Fleck, PT, MPT, OCS
Kevin B. Ford, PT, DPT, OCS
Ian R. Fraser, PT, OCS
John J. Fraser, PT, MS, OCS
Sean M. Freeman, PT, MSPT, OCS
William Gabriel, PT, DPT, OCS
Katharine L. Gaj, PT, DPT, OCS
Janet R. Gammon, PT, OCS
Olalekan Ganiyu, PT, MHSc, OCS
Kristina W. Ganter, PT, OCS
Amy G. Garrigues, PT, DPT, OCS
Steve A. Gaskill, PT, MPT, OCS
Laura M. Gavan, PT, MSPT, OCS
Loretta A. Gleason, PT, OCS
Craig P. Goldberg, PT, MPT, OCS
Lorenzo Gonzalez, PT, DPT, OCS
Christina Goodnough, PT, MSPT, OCS
Jennifer V. Gotantas, PT, OCS
Eric B. Graham, PT, DPT, OCS

Mary Ann Graham, PT, MSPT, OCS
Kenyon Grant, PT, MPT, OCS
Jason A. Gray, PT, OCS
Megan M. Greco, PT, DPT, OCS
Blair H. Green, PT, MPT, OCS
Margaret M. Grey, PT, MA, OCS
Jason K. Grimes, PT, MPT, OCS
Keith W. Groppel, PT, MSPT, OCS
Jennifer Gruber, PT, MPT, OCS
Johanna P. Guarino, PT, OCS
Michael A. Guido, PT, OCS
Holly K. Gullickson, PT, OCS
Alfred B. Gurney, PT, OCS
Melissa A. Hager, PT, DPT, OCS
Ryszard J. Hajduczek, PT, OCS
Janet Hakey-Brusgul, PT, MS, OCS
Dyanna Haley-Rezac, PT, DPT, OCS
Mark K. Hall, PT, MSPT, OCS
Nancy E. Hamilton, PT, OCS, SCS
Ellen M. Hangen, PT, MPT, OCS
Donald H. Hansen, PT, MPT, OCS
Michael Hansen, PT, MPT, OCS
Shannon R. Harbaugh, PT, DPT, OCS
Susan S. Hardin, PT, DPT, OCS
Jason M. Hartsfield, PT, OCS
Anne D. Hase, PT, OCS
Suzanne T. Hawson, PT, MPT, OCS
Zachary J. Hawthorne, PT, OCS
Brian Hay, PT, MSPT, OCS
Amy E. Heath, PT, DPT, OCS
Mark C. Hedetniemi, PT, DPT, OCS
Marguerite Heie, PT, MPT, OCS
Patrick J. Heil, PT, OCS
Timothy Hennum, PT, MPT, OCS
Kenneth L. Herbel, PT, MPT, OCS
Ivan Hernandez, PT, DPT, SCS, OCS
Daniel W. Higgins, Jr., PT, DPT, OCS
Vanessa M. Hodge, PT, DPT, OCS
Amie Holbrook, PT, MSPT, OCS
Yvette K. Honda, PT, DPT, OCS
Jennifer L. Hsieh, PT, MPT, OCS
Dana K. Hughes, PT, OCS
Krista Hughes, PT, MPT, OCS
Gretchen Hull, PT, OCS
Matthew M. Hunkovic, PT, OCS
Airelle Hunter-Giordano, PT, MPT, SCS, OCS
Theresa Hee Hwang, PT, DPT, OCS
Robert N. Incitti, PT, OCS
Christopher J. Ivey, PT, MPT, OCS, SCS
Sasha L. Jackson, PT, OCS
Paul G. Jenkins, PT, MSPT, OCS
Bridget L. Johnson, PT, OCS
Jerilyn A. Johnson, PT, OCS
Scott P. Johnson, PT, OCS
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Immersion of the Youthful Voice

Adam Smith, PT, OCS
Chair, Membership Committee

The Orthopaedic Section is constantly seeking ways to meet the needs of its members and remain at the forefront of ideas and policies that will shape our profession. In recent years we have continued to grow in the number of clinicians and students who have felt it beneficial and/or imperative to be a member of the Orthopaedic Section. As the largest Section of the APTA, we have a responsibility to act as a guiding voice to help lead the way for some of the Association's missions and goals.

It has been echoed numerous times that our profession has a vision. VISION 2020: A mere phrase to those on the outside, but a look at what could and should be to the members of the APTA. Perhaps it is more correct to say, for those who have made it their responsibility to create this vision or even to actively read its content. Vision 2020 is an awesome concept filled with ideas and strategies that can ultimately positively reshape our profession. However, a vision is for the future. It is meant for those who will be affected by its details 10, 20, and 30 years from now. My fear is that those who will be affected most by the changes we are fighting for do not realize its importance or its relevance.

The leaders of the APTA and the Orthopaedic Section realize the importance, but of course they are the ones that helped create its goals. They are the ones now working to make the vision a reality. This is not to say that grass-root efforts have not been involved. Of course, nothing in our profession can happen without the efforts and commitment of the members of the Association. However, it is the new graduate and it is the students of our profession that need to feel its importance and the strength of its concepts. It is for this reason that it is essential to find ways to get our young professionals more involved. We must immerse them in the issues and put them on the frontlines of our fights.

The APTA has realized this and made tremendous efforts to gain their involvement. They have developed the Real World Physical Therapy Seminars and Preview 2020, both of which are specifically targeting new graduates. They have created a newsletter called *Perspectives* that is sent to the APTA's new professionals. In keeping with the Section's ability to remain on the forefront of our Association, they previously allowed a new graduate to hold a leadership position on their Membership Committee. In fact, this is how I am in the position to write this article.

Once again, the Orthopaedic Section has developed an innovative means to aide the APTA in its attempt to increase involvement of our profession's students and new graduates. The Orthopaedic Section has recently adopted two new projects to work towards this goal. First, the Orthopaedic Section has approved the **New Graduate Return to School Program**. The details of this program are:

> *50% off membership for those new graduates who choose to give a presentation about his/her experiences as a new graduate and how the Orthopaedic Section has helped them. These students will receive this discount for a maximum of 2 years after graduation. They must provide written proof that they have given a presentation to students at a school or at a chapter meeting in order to receive the discount. At the end of his/her 2-year term, they will be in charge of appointing a new presenter and alerting the Orthopaedic Membership Committee concerning his/her identity*.

This initiative will be applicable to second and third year physical therapy students who are willing to commit to this endeavor once they have graduated.

The second of these projects is the formation of an Orthopaedic Chapter Liaison Program. This endeavor has been initiated in order to increase communication between the Section and its members. Any active member can perform this duty, but it is my hope and will be promoted as a role that can be filled by a third year student or new graduate.

The Orthopaedic Section's Membership Committee believes that these initiatives have the potential to introduce the benefits of our Section to many more students and new graduates throughout the country. More importantly, however, it is a new way to get the young voices of our profession involved in the Association and immersed in the issues. It is my personal hope that it helps to create an influx of young professionals determined to follow through with the visions created by their mentors and predecessors. I ask you as members of the largest and perhaps most influential Section to help these projects meet its potential. Spread the word. Let the students and new graduates that you are in contact with understand that they are being sought after. Let them know that we need their involvement and we hope see them by our side as we proceed towards the goals of our Section and Vision 2020.

GREETINGS OHSIG MEMBERS

An OHSIG BOD conference call was held Oct 16, 2007. An email blast will follow to all OHSIG members; the following is a sneak peak of "News from your Board."

The OHSIG petition to ABPTS for certification in OHPT is still underway. The OHSIG BOD members will review the final document. In addition, we are in process of getting data clarification related to the Practice Analysis. We are in the final phase of completing the manuscript for publication.

There is an opportunity to work with OSHA on a regional level. Region 5 is interested. Dennis Isernhagen, who was a member of the OSHA OHSIG Task Force, will represent MN APTA. Margot will represent OHSIG.

Safe Patient Handling & Movement in Rehabilitation was presented at PT 2007 in Denver. Presenters included Dr. Audrey Nelson, Director of the Patient Safety Center at the Tampa VA; Dr. Tom Waters, a biomechanist and researcher at NIOSH; Dr. Ken Harwood from APTA; and Kathy Rockefeller, OHSIG VP. This was the first time this topic had been presented at a national PT meeting.

OSHA Region 5 will be holding a conference on May 30th in Milwaukee with the focus on safe patient handling in rehabilitation settings. Kathy will be presenting the keynote address. In addition there is a potential opportunity to develop an Alliance type relationship with NIOSH. We will keep members informed of this.

It's time to review our Occ Health Guidelines. We will be forming a Task Force to assist this process. The plan is for the Task Force to meet at CSM. More to follow.

Jennifer Pollak agreed to assume Nominating Committee Chair position for Linda Nicoli. Linda's business needs resulted in her need to turn over the chair position. Linda will continue to be an active supporter of the OHSIG. The Board thanks Linda for her work with us, as well as thanks Jennifer for agreeing to the chair position.

And lastly, OHSIG congratulates Drew Bossen, OHSIG Practice Chair. Drew will receive the 2007 Service Award for the Private Practice Section. "It is due to his vision and leadership that many private practices have grown in their services and made new inroads to the business world. Drew tirelessly services the Private Practice Section, having been a past Board member and past Vice President. He is a PAC member and currently the Vice President of the Educational Institute of Private Practice Physical Therapy." In addition to this, Drew is an active member of the OHSIG and a member of OHSIG BOD. Congratulations Drew!

Sincerely,
Margot Miller, PT
OHSIG President

USING ERGONOMICS IN INJURY MANAGEMENT RESULTS IN BOTTOM LINE SAVINGS

Nicole Matoushek, MPH, PT, CEES

THE ECONOMIC BURDEN OF WORKPLACE INJURIES

According to the Occupational Safety and Health Administration, every year workplace injuries, illnesses, and deaths cost our nation $170 billion.[1] There are direct costs and indirect costs associated with all workplace injuries. Direct costs are those payments made to the employee and medical care providers. Indirect costs refer to the costs associated with lost productivity, training, administrative time, reduced product quality, overhead costs, legal fees, and increased insurance premiums. In 2001, the economic burden to our nation from over-exertion injuries or injuries caused by excessive pushing, pulling, lifting, holding, or carrying resulted in $9.8 billion in direct costs, repetitive motion injuries totaled $2.3 billion in direct costs, and the indirect costs associated with these ergonomic injuries accounted for $39 billion.[2]

There is a relationship between workplace safety and a company's performance and profits. As workplace injuries increase, the injury claims increase and profits suffer. Company safety and ergonomic programs can reduce injuries and increase company bottom line profits. In fact, one study estimated that a good safety and health program can save $4 to $6 for every $1 invested.[1] The direct results from these programs include: reduced workers' compensation and medical costs, diminished absenteeism, lower employee turnover and training costs, and higher productivity and employee morale.

Using Ergonomics in Injury Management

Ergonomics can be used in managing workplace injuries in order to control and contain injuries and the associated costs, therefore increasing the company profitability. The results of using ergonomics in injury management include: a prompt and safe return to work, cost savings, and injury containment. By using ergonomics in injury management, injured workers will be able to safely and promptly return to productive work duties with a reduced chance for reinjury or injury progression. This in turn, reduces the indemnity costs associated with lost time injuries, increases employee performance, and reduces direct medical costs related to treating subsequent injuries that may result from continued exposure to ergonomic risk factors.

The key to work-related injury management is a strong understanding of ergonomics and how work demands affect human performance and disease development. Core competencies in ergonomics, clinical management of work-related injuries, and ergonomic risk control are essential to successful work-injury management.

ERGONOMICS

Ergonomics is the study of the interaction between work, the workplace, and the worker. Taken from the Latin words "*Ergo*" meaning "*work*" and "*nomos*" meaning the "*study of,*" ergonomics literally means the "*study of work.*" However, today's application of ergonomics refers to fitting the work to the worker in order to enhance productivity, design workflow, control errors, and reduce the musculoskeletal strain and fatigue from performing work tasks. Ergonomics reduces risk factors known to contribute to occupational ergonomic injuries.

Traditionally, ergonomics has been primarily used in the workplace for injury prevention. Ergonomic committees and safety teams have focused efforts on identifying high risk jobs and controlling ergonomic risks to reduce the rate at which work-related injuries occur and the costs associated with these injuries. For example, the ergonomics team may identify that injury rates have increased on a particular production line when compared to prior year incidence rates. This increase in injury rates results in losses in production and increases in the workers' compensation costs. The ergonomic efforts would focus on identifying and controlling further work-related injuries from occurring on this line.

On the other hand, applying ergonomics to injury management once a work-related injury has occurred, can have an even greater affect on work-related injury costs and challenges. For example, if a worker who has sustained a shoulder strain injury due to exposure to ergonomic risk factors such as high repetition, forceful exertions, and positional strains such as frequent overhead lifting, the cost of this work-related injury may easily escalate out of control if the employee is unable to safely return to work or the ergonomic issues are not promptly addressed.

HOW TO USE ERGONOMICS IN INJURY MANAGEMENT

There are 3 applications for applying ergonomics in injury management, they include: Injury Containment, Return to Work Transitions, and Injury Reduction.

Injury Containment

Often times, when a worker is injured due to exposure to ergonomic risk factors, he or she is taken out of work temporarily or put on restricted work duty. Overtime, the injury heals either partly or completely and the injured worker is returned back to work at full duty and at full exposure to the ergonomic risk factors that may have potentially caused or influenced the development of the original injury. If these ergonomic risk factors are not identified and controlled, there is potential that the original injury may reoccur. In other scenarios, with repeated exposure to ergonomic risk factors, the injury may progress from a mild, relatively easy to treat disorder to a severe, catastrophic injury that may be costly and difficult to manage.

For example, a worker has sustained a wrist injury and is diagnosed with wrist strain. The injury has developed from exposure to the ergonomic risk factors of high repetitions, forceful grasping, and repeated wrist flexion and wrist extension. If the injured worker returns to full work duty and full exposure to these risk factors, the wrist may be weakened and more susceptible to reinjury or further injury if the ergonomic risk exposure is not controlled. Over time, the wrist injury may not heal or a mild wrist strain injury may progress to carpal tunnel syndrome, other inflammatory condition, or even require a carpal tunnel release surgery and extensive rehabilitation. As the injury continues or progresses, the length of time away from work and productive duties increases and the average cost per injury claim increases. For example, the average cost per injury claim for a mild wrist injury, such as wrist strain is $8,000.[3] The average cost per injury claim for a moderate wrist injury, such as carpal tunnel syndrome is $14,000 (Figure 1).[3] However, severe injuries such as carpal tunnel release, including; surgery, compensation, therapy, legal fees, administrative costs, and settlements approach $250,000.[4]

By using ergonomic applications to identify and reduce the ergonomic risks that produce excessive strain to the wrist, the wrist injury can be contained to a mild disorder, as opposed to continuing or progressing to a more severe and costly injury or condition such as carpal tunnel syndrome. This concept is called "Injury Containment," as ergonomic implementations control and contain the injury and the associated costs. The cost savings associated with injury containment for the wrist are illustrated below.

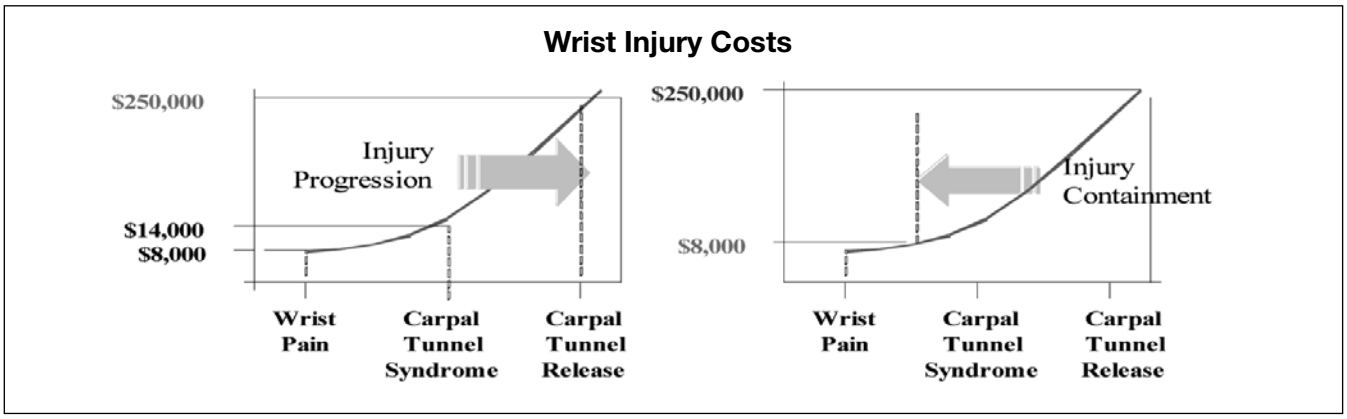

Figure 1. Injury containment. As an injury progresses from a mild condition to a more severe condition, the costs of the injury escalate. This is illustrated as the costs of the wrist injury increase significantly as the injury progresses from pain to carpal tunnel syndrome to a carpal tunnel release. Injury containment works by controlling the injury, therefore preventing the severe injury from occurring and therefore containing the costs.

Return to Work Transitions

When a worker is injured at the workplace, the medical management of the injury includes an assessment of fit for duty or return-to–work readiness. As stated earlier, often times following a work-related injury, the worker may be temporarily out of work or put on work restrictions. The actual costs of a lost work day due to injury are staggering. For every $1 spent on direct costs of work injuries, $4 to $10 are spent on the indirect or hidden costs such as training and lost productivity.[5,6]

The goal of any organization, in regards to return to work, should be to provide a prompt return to work to minimize the lost work days due to the injury. The goal should be to provide alternate work duties that are productive, fall within the physician's noted work restrictions, and prevent the worker from becoming further deconditioned with a reduced activity level. Using ergonomics in injury management and return to work transitions can help facilitate a prompt return to work and allow the injured worker to work at moderate levels, remain productive, and yet allow for the injured tissues to heal.

An example of using ergonomics for injury management in return to work transitions can be described in the following scenario. An injured worker has injured his back; the physician has imposed work restrictions of "*No repetitive bending, squatting, twisting, or lifting over 20#.*" The employee's supervisor has reviewed the employee's job descriptions and has determined that the employee's regular full time duty as a lineman requires physical demands that exceed these work restrictions. The supervisor first thinks to send the employee home, as he cannot perform 100% of his full duty activities with the imposed restrictions. The average indirect costs associated with lost time injuries are estimated at approximately $600 a week. Over a few weeks or months, the injury-related costs can accumulate into the thousands and tens of thousands of dollars.

When using ergonomics with injury management, the additional steps of reviewing alternate work duties, along with identifying the ergonomic risks and control measures can provide an alternate solution of return to work transitional duty and allow the injured employee to return to work, at a safe and productive level, immediately. The cost savings of lost wages, training, and lost productivity will be significantly reduced. An example of using ergonomics with return to work transitional duties is illustrated below. In the example of the injured employee who is currently out of work because his full time job requirements involve physical demands that exceed the physician's imposed work restrictions for his back injury. The supervisor or medical personnel may review the various aspects of the employee's full time job, or alternate job duties within the same department. The job tasks that fall within the work restrictions should be identified. These activities may be components of full duty tasks or duties of an alternate, lighter job. In the case of the lineman, 2 of the essential functions of the job of a lineman are to clean and organize the truck and to assemble mechanical parts. Although these work tasks are essential to the job of a line man, these tasks are only a portion of the lineman's essential work functions. By identifying these essential work tasks, or components of essential work tasks, as falling within the work restrictions, will provide productive work activities and a plan for increasing and transitioning the injured worker as the work restrictions are lifted and the employee becomes more functional.

Injury Reduction

The third aspect of using ergonomics in injury management results in injury reduction or the prevention of work-related injuries from occurring in other workers. This is considered injury reduction, as the presence of quantified ergonomic risk factors and control measures are identified and managed. A plan is implemented to control ergonomic risk, therefore reducing the work-related injuries that may have occurred had the ergonomic risks not been controlled. An example of injury reduction can be illustrated with the example of the production line worker with the shoulder injury who is exposed to the ergonomic risk factors of high repetition, forceful exertions, and positional strains including frequent overhead lifting. Injury management occurs as the ergonomic risk factors are controlled for this individual and the employee is transitioned back to full duty. The specific ergonomic controls for this individual will focus on reducing shoulder strain and may include: alternating work duties to reduce repetition, lowering the production line height to eliminate the frequent overhead lifting, and reducing package size to reduce the forceful exertions experienced at the shoulder joint. By controlling these ergonomic risk factors for the individual employee as part of injury management, these ergonomic risk factors were also controlled for all of the other production line workers who are also exposed to these same risks. The end result is a reduction in shoulder injuries at this production line.

CORE COMPETENCIES FOR USING ERGONOMICS IN INJURY MANAGEMENT

The required skill and core competencies for using ergonomics for injury management include a strong clinical background and understanding of anatomy, work demands, the physiological affects of work, cumulative trauma development, the science of ergonomics, and ergonomic risk control measures.

Adequate training and experience is recommended for those clinicians involved with ergonomics and work injury management. Competencies and clinical expertise in work factors and the body's physiological response to work factors is critical in work injury management and ensuring a safe and appropriate return to work. For example, if an injured worker is returned to work following an ergonomic-related injury, and the exposure to the ergonomic risk factors that caused or contributed to the initial injury are not controlled, there is a probability that the injury will not completely heal, reoccur, or progress to a more severe condition. A thorough understanding of the anatomy and physiology of human work performance and work load factors is essential to identifying and controlling the exposure to the most severe ergonomic risks.

SUMMARY

Preventing and controlling ergonomic risk factors in the workplace can effectively reduce workers' compensation costs and increase company profitability. Often the costs associated with a workplace ergonomic and safety program are only a fraction of what one work-related injury claim would cost. For some companies, this may be the difference between being above or below the profit margin.

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Nicole has over 11 years in physical therapy, ergonomics, worker rehab, and working in the work comp industry.

The Foot and Ankle SIG has been undertaking a project to evaluate if there is discrepancy between what is being taught in entry-level physical therapy programs with respect to the foot and ankle curriculum and what is being used by physical therapists in clinical practice. If discrepancies are identified, recommendations can be given to faculty as to what are essential components that should be taught to entry-level students to help them effectively manage patients/clients with foot and ankle related disorders. Additionally, it will help our SIG to steer Physical Therapists in the appropriate direction in terms of attaining advanced information through continuing education and clinical fellowships regarding this area of interest.

To accomplish this project, we have constructed a 3 part survey. Part I collects basic demographic data. Part II relates to issues of clinical practice and should be completed by clinicians who treat patients with foot and ankle related pathologies. Part III relates to educational issues and should be completed by individuals who teach in entry level MPT or DPT programs. This survey was published in OP 2007;19(3):163-164. It can also be accessed on line at: https://www.orthopt.org/pt/issue_28_article_108.pdf. These surveys can be completed as hard copies and mailed to the Orthopaedic Section, APTA, 2920 East Ave S, Ste 200, LaCrosse, WI 54601 ATTN: Tara. Alternatively, an online version of the survey can be found at www.orthopt.org/sig-fa-survey.php.

The members of the Foot and Ankle SIG thank you in advance for your time and cooperation. We hope you are able to attend our the Foot and Ankle SIG Business

FOOT & ANKLE SURVEY

The following survey is being conducted by the Foot and Ankle Special Interest Group of the Orthopaedic Section to collect clinical and education information.

Part I should be completed by all individuals who complete the survey.

Part II relates to issues of clinical practice and should be completed by clinicians who treat patients with foot and ankle related pathologies.

Part III relates to educational issues and should be completed by individuals who teach in MPT or DPT programs.

Please answer all questions to the best of your ability. Thank you for your time!

Part I. Demographic Data:

A. Highest Academic Degree: BS/BA _____
Entry Level Masters _____ Advanced Masters _____
Doctorate _____

B. Years of clinical experience: 0-2 _____ 3-5 _____
6-10 _____ 11+ _____

C. Primary work setting:
_____ Acute Care Hospital _____ Private Practice
_____ Rehabilitation Center _____ School System
_____ Extended Care Facility _____ College/University
_____ Outpatient Facility
_____ Other (specify) _____

D. Certifications:

Part II: For individuals who treat patients with foot and ankle related disorders please answer question 1- 7

1) Percentage of time treating patients with foot and ankle related disorders:_____%

2) Please List the 10 most frequent musculoskeletal conditions you treat in a clinical setting (1 = most frequent)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

3) Of the following 8 neurological conditions please place a number 1-8 rating the frequency that you treat each condition. (1 = most frequent)

_____ Axontomesis _____ Neuropraxia
_____ Neuroma _____ Drop Foot
_____ Nerve Entrapment _____ Clonus
_____ Neuromesis
_____ Other, List: _____
_____ N/A Do not see neurological conditions

4) Of the following 6 dermatological conditions please place a number 1-6 rating the frequency that you treat each condition. (1 = most frequent)
_____ Blisters _____ Ulcers
_____ Infections _____ Abscesses
_____ In-Grown Toe Nails
_____ Other, List: _____
_____ N/A Do not see dermatological conditions

5) Of the following 6 pediatric conditions please place a number 1-6 rating the frequency that you treat each condition. (1 = most frequent)
_____ Osteochondrosis _____ Server's Disease
_____ Epiphyseal Fracture _____ Iselin's Disease
_____ Ossification/Maturation Tables
_____ Other, List: _____
_____ N/A Do not see pediatric conditions

6) Of the following 13 surgical conditions please place a number 1-13 rating the frequency that you treat each condition. (1 = most frequent)
_____ Akin Procedure _____ Amputation
_____ Mitchell Procedure _____ Keller Procedure
_____ Jones Procedure _____ Dwyer Procedure
_____ Kidner Procedure _____ Ertl Procedure
_____ Hallux Arthrodesis _____ Chevron Procedure
_____ Girdelstone Procedure _____ Siffert Procedure
_____ Samilson Procedure
_____ Other, List: _____

7) Of the following 3 tests please place a number 1-3 rating the frequency that you are involved with each. (1 = most frequent)
_____ Arteriography
_____ Venography
_____ Electromyography

Part III: For individuals who engage in teaching students in a University/College setting at either a MPT or DPT program please answer questions 8-26 as it relates to the foot and ankle curriculum.

1 = Covered Thoroughly 2 =Partially Covered 3 = Reviewed 4 =Assumed Known 5 = Not Covered

8) Are biomechanics of gait covered, including normal and abnormal biomechanics, terminology, joint axes, and ROM? Currently:___ Ideally:___

9) Are normal and abnormal gait characteristics covered? Currently:___ Ideally:___

10) Are foot-types, including cavus and planus, as well as pathomechanics of foot and ankle etiologies covered? Currently:___ Ideally:___

11) Is shoe-wear prescription covered, including diabetic foot, athletes, and neuropathic foot covered? Currently:___ Ideally:___

12) Are foot orthotics covered, including casting, posting, material selection, etc.? Currently:___ Ideally:___

13) Do students receive information about myo-fascial pain and referred pain consistent with Simons and Travell's work? Currently:___ Ideally:___

14) Does the pharmacology curriculum address diabetic, neurological, and arthritic neuropathies pertaining specifically to the foot/ankle? Currently:___ Ideally:___

15) Is prophylactic and/or functional taping covered within a laboratory or class setting? Currently:___ Ideally:___

16) Do students receive information regarding foot/ankle prophylactic/functional bracing? Currently:___ Ideally:___

17) Do students receive information regarding isokinetic exercise as a type of therapeutic exercise in a lab setting? Currently:___ Ideally:___

18) Do students receive information regarding proprioception and kinesthetic awareness, including the use of therapeutic exercise to improve these functional bases in a lab setting? Currently:___ Ideally:___

19) Do students receive information and guidance on joint mobilizations at the foot/ankle, including glides, slides, and distractions in a lab setting? Currently:___ Ideally:___

20)	Do students receive information on stretching of lower extremity muscles, as they relate to the foot/ankle in a lab setting?	Currently:___	Ideally:___
21)	Do students receive information regarding open versus closed-kinetic chain exercises in rehabilitation in a lab or class setting?	Currently:___	Ideally:___
22)	Do students receive information regarding proprioceptive neuromuscular facilitation techniques in a lab or class setting?	Currently:___	Ideally:___
23)	Do students receive information regarding muscle energy technique in a lab or class setting?	Currently:___	Ideally:___
24)	Do students have an opportunity to observe open/arthroscopic surgeries to the foot/ankle, including orthopedic or podiatric procedures as part of class or lab, or during affiliation/internship opportunities?	Currently:___	Ideally:___
25)	Are students instructed in surgical techniques and procedures, including procedure selection, and rehabilitation protocols?	Currently:___	Ideally:___
26)	Are students presented information about physical agents, specifically for dysfunction and derangements related to the foot/ankle?	Currently:___	Ideally:___

painmanagement

SPECIAL INTEREST GROUP

PRESIDENT'S MESSAGE
CAM AND THE PHYSICAL THERAPIST

John Garzione, PT, DPT

Just returning from the American Academy of Pain Management Meeting, I was recharged and curious. I was recharged with new knowledge that will help me in my practice, but very curious as to why the subject of CAM (Complementary and Alternative Medicine) was gaining more popularity and lecture time in a multidisciplinary meeting. A cursory search of Pub Med led me to 702 articles about CAM dating back as early as the 1950s and ending with 2007 with a majority of articles written in the past 7 years. CAM treatments include: chiropractics, acupuncture, massage therapy, biofeedback, prayer, and naturopathy. The list of therapies included under CAM changes gradually. If and when an approach regarded as "unproven therapy" is proven to be safe and effective, it may be adopted into conventional health care and over time may cease to be considered "alternative." The most cited reason for persons using CAM is chronic musculoskeletal pain with 84% of the people who were questioned in England using at least one CAM treatment for pain the previous year, and 80% of those had previously used conventional treatment. Sixty-nine percent of the respondents used a combination of CAM and conventional treatments with the most popular CAM treatments being Glucosamine and fish oil.[1] In The United States, 56% of the people who were in pain, obtained relief from conventional medical care and 92% of pain suffers tried 3 or more CAM treatments even though many CAM treatments were not covered by health insurance.[2]

Evidence based usage of CAM treatment using double blind placebo controlled experiments are limited. Although advocates of alternative medicine acknowledge that the placebo effect may play a role in the benefits that some receive from alternative therapies, they point out that this does not diminish their validity. Researchers who judge treatments using the scientific method are concerned by this viewpoint, since it fails to address the possible inefficacy of alternative treatments. As long as alternative treatments are used alongside conventional treatments, the majority of medical doctors find most forms of complementary medicine acceptable. Most patients are reluctant to share information about their use of CAM therapies because they are concerned that their health care provider will disapprove. By remaining open-minded, you can learn a lot about your patients' use of unconventional therapies.

I recommend asking *every* patient about his or her use of alternative therapies during routine history taking. One approach is simply to inquire, "Are you doing anything else for this condition?" It's an open-ended question that gives the patient the opportunity to tell you about his or her use of other health care providers or therapies. Another approach is to ask, "Are you taking any over-the-counter remedies such as vitamins or herbs?"

Although knowledge about vitamins and herbs are not a major focus of our profession, it behooves the practicing physical therapist to have a working knowledge of the effects, side effects, and interactions from the most common preparations. For example, a person who takes Coumadin may be cautioned about not taking Ginkgo biloba as bleeding times may increase with this combination.[3]

So why is it important for the pain management physical therapist to learn about CAM? I'll leave the rest of the answers up to you.

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EFFECTS AND ADVERSE REACTIONS TO VITAMINS AND SUPPLEMENTS

John Garzione, PT, DPT, DAAPM

Keeping with the focus of "The President's Message" of the Pain SIG, I compiled a short list of the 8 most common over the counter supplements that people, who are seen in my office, report taking. This list is by no means complete and is meant for informational purposes only. For a more complete description of each supplement you can visit http://www.pdrhealth.com/drug_info/nmdrugprofiles/nutsupdrugs/vit_0266.shtml.

Among herbs and other specialty products, melatonin and homeopathic products—prepared from minuscule amounts of substances as diverse as salt and snake venom—had the most reports of reactions in 2005. The poison centers received 2,001 reports of reactions to melatonin, marketed as a sleep aid, including 535 hospitalizations and 4 deaths. Homeopathic products, often marketed as being safe because the doses are very low, were linked to 7,049 reactions, including 564 hospitalizations and 2 deaths.

In 2005, the poison centers received 203 reports of adverse reactions to St. John's wort, including 79 hospitalizations and

Supplement	Proposed Action	Most Common Adverse Reactions	Comments
Glucosamine	Stimulates connective tissue to repair itself. Chondroprotective	May temporarily increase short-term blood sugars in type-2 diabetes.	8 weeks to effect; Antithrombitic, should stop taking 2 weeks prior to surgery.
Chondroitin Sulphate	Provides building block for cartilage production.	Mild gastrointestinal such as epigastric distress, nausea, and diarrhea.	Caution in shellfish allergy. Poorly absorbed 15-18% versus 80% for glucosamine.
Melatonin	Showed significant analgesic effect in animals. Produced in the pineal gland, mostly associated with sleep.	Stomach discomfort, morning grogginess, daytime "hangover," feeling of a "heavy head," depression, psychotic episodes (in combination with fluoxetine), headache, lethargy, fragmented disorientation, amnesia, inhibition of fertility, hypothermia, retinal damage, gynecomastia, low sperm count.	Caution with autoimmune diseases.
Thiamine	Especially useful in cases of neuritis. Shooting pain in legs associated with chronic liver disease or alcoholism, diabetes, nerve and joint pain. May also be associated with B2 deficiency.	Weakness, sweating, nausea, restlessness, tightness of throat.	Should be combined with a B-complex vitamin.
Niacin	Anti-arthritic supplement. Increases joint mobility and decreases joint pain.	Can cause vasodilation of cutaneous blood vessles resulting in increased blood flow, principally in the face, neck, and chest.	Contraindicated in chronic liver disease.
Vitamin C	Antioxidant useful for muscle and gum pain.	Over 3 grams daily can cause gastrointestinal reactions including: nausea, abdominal cramps, diarrhea, and flatulent distention.	Dose limited by loose bowels.
Vitamin E	Antioxidant	Fatigue, breast soreness, emotional disturbances, thrombophlebitis, retinuria, GI disturbances, altered serum lipid levels, and thyroid problems.	May decrease heart disease risk in type-2 diabetics. Should stop taking 2 to 4 weeks prior to surgery.
Magnesium	Inhibits the release of acetylcholine from motor end plates and causes muscle relaxation. Depletion facilitates neuromuscular excitability producing tremor, cramps, and tetany.	Some salts may cause nausea and diarrhea through osmotic effect in bowel. (Usually seen with citrate and sulfate salts.)	

1 death. Glucosamine, with or without chondroitin, was linked to 813 adverse reactions, including 108 hospitalizations and 1 death.

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DEAR PASIG MEMBERSHIP!

TIME TO ACT!

The PASIG is busy and is calling membership into Action! Voting occurred in November. Did you vote? The Nominating Committee is under the direction of Stephania Bell. She put together an outstanding group of individuals to run for 2008 office. There is still time to join a committee and/or step up to run for office (2009) and help us all continue to provide useful services to our membership. Please consider joining and working on the research, education, practice, and membership committee.

This issue is focused on the Research Committee and their outstanding work on the monthly research citation blasts. The committee is under the direction of Shaw Bronner and there have been many outstanding contributions to make the citation blast a useful tool for membership to access regarding the latest in evidence with practice. Please consider contributing to the monthly blasts by volunteering to author a citation blast.

There is outstanding programming planned for CSM 2008 which will focus on the cervicothorarcic region. I hope that all of you will be able to join us in Nashville for the business meeting and PASIG programming. Please contact Tara Jo Manal if you have any questions or ideas on this or future topics for the PASIG programming.

The Student Research Scholarship Committee is also looking for candidates to apply for the CSM scholarship award for 2008. Please contact Leigh Roberts if you know of a student group that would qualify for this award or if you have questions concerning this process. All of the committees need help and can use new and fresh ideas from the membership. The contact information for all of the chairs and executive board is listed in this newsletter and is also located on the website at www.orthopt.org.

Thank-you again to all whom make this organization so dynamic. Please consider a new commitment to the PASIG to join us in making an even better organization to meet all of membership's needs. *Caring for the Arts brings out the best in all of us!*

Susan C. Clinton PT, MHS, OCS
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JOIN US FOR COMBINED SECTIONS MEETING IN NASHVILLE FEBRUARY 6-9,2008

Business Meeting/Reception 7:00-8:00 AM breakfast meeting, come wake up with us!
Programming: Friday Morning 8:00- 11:00 AM

Performing artists are involved in heavy use of cervicothoracic complex. Figures skaters and dancers use upper extremity momentum to generate lift while musicians rely on this stable base to anchor their movements. An emerging relationship between the thoracic spine and neck pain and radicular symptoms has been recently elucidated in the literature and the findings will be reviewed and the application to the performing artist will be discussed. This session will walk clinicians through the evaluation of the cervical and thoracic spine and the evidence of successful management of cervical radiculopathy and thoracic manipulations will be included.

EVALUATION AND TREATMENT OF CERVICOTHORACIC PAIN AND DYSFUNCTION- FREEING THE PERFORMING ARTIST TO REACH NEW HEIGHTS

8:00–8:45	Evidence-based Evaluation and Treatment of Neck Pain in the Performing Artist Josh Cleland, PhD, PT, FAAOMPT
8:45–9:00	Case Example A Performing Arts PT
9:00–9:45	Evidence based Evaluation of Cervical Radiculopathy Sara Piva, PhD, PT
9:45–10:00	A Dancer with Serratus Anterior Insufficiency Kendra Hollman
10:00–10:15	T3/T4 Syndrome in Performing Artists Sue Stralka, MS, PT
10:15–10:35	Medical Interventions for Cervical/Thoracic Pain (meds, imaging, interventional pain mgmt, etc) Bhaskar AdityaMukherji, MD
10:35–11:00	Panel Discussion (15-20 min depending on time) All Speakers

PASIG MONTHLY CITATION BLAST

As PASIG Research Chair, in June 2005 I initiated a monthly *Citation Blast* of new performing arts references that is e-mailed to each member of the PASIG. Annually following CSM, we also send a *Citation Blast* to every Orthopaedic Section member, in hopes that they may be interested in finding out more about us and joining our SIG. We anticipate that these monthly postings will not only alert PASIG members to new evidence that may be helpful in their practice, but also may inspire member contributions to performing arts research by developing new avenues of research, submitting abstracts for a platform or poster presentation for a future CSM, contributing to the APTA's "*Hooked on Evidence,*" or writing new peer-reviewed manuscripts. The monthly blasts also serve to alert members to performing arts-related upcoming events and news.

The idea for the citation blast was based on the highly successful weekly electronic *BIOMCH-L Literature Update*. This update is organized by topic, making it easy to scan to see if there is new research that one may wish to read. Our initial *Blast* was organized with 4 topics: Ice Skating, Gymnastics, Music, and Dance, and 5 categories in each grouping: Biomechanics & Motor Control, General, Injury & Epidemiology, Injury & Rehabilitation, and Other – Related. Each month's citations are added to the specific topic EndNote library and the libraries and *Blasts* are posted on the PASIG webpage for our members to access and download.

In April 2006, we began a special topic series of blasts in a new format: an annotated bibliography of articles on a selected topic over the past decade. This format allows members to learn a bit more about each reference. PASIG members volunteer to compile a special topic or suggest new ideas to the series.

PASIG MONTHLY CITATION BLAST TOPICS

No. 1, June 2005	General format
No. 2, July 2005	General format
No. 3, Aug. 2005	General format:
No. 4, Sept. 2005	General format
No. 5, Nov. 2005	General format
No. 6, Dec. 2005	General format
No. 7, Jan. 2006	General format
No. 8, Mar. 2006	General format
No. 9, April 2006	*Pathology of the Hallux Sesamoids*
No. 10, May 2006	General format
No. 11, June 2006	*Flexor Hallucis Longus Disorders*
No. 12, July 2006	*Emergency Response*
No. 13, Aug, 2006	General format
No. 14, Sept. 2006	*Focal Dystonia*
No. 15, Oct. 2006	*Assessing and Training Core Control*
No. 16, Nov. 2006	*Popliteus Dysfunction*
No. 17, Jan. 2007	*Hip Pathology*
No. 18, Mar. 2007	*Posterior Tibial Tendon Dysfunction*
No. 19. April 2007	*Thoracic Outlet Syndrome*
No. 20, May 2007	*Osgood-Schlatter Dis.*
No. 21, June 2007	*Stress Fractures of the Foot and Ankle in Dancers'*
No. 22, July 2007	*Postural Stability*
No. 23, Aug. 2007	General format
No. 24, Sept. 2007	*Scapulothoracic Joint Dysfunction and Control*
No. 25, Oct. 2007	*Metatarsal Stress Fractures in Dancer*

Please contact me for more information.

Shaw Bronner PT, PhD, OCS
PASIG Research Chair
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STATE GOVERNMENT AFFAIRS FORUM SPECIAL REPORT

Amie Lamoreaux Hesbach, MSPT, CCRP, CCRT, APTSIG President

As many of you are aware, things are heating up legislatively with regards to the practice of physical therapy on animals in many states of the United States. Justin Elliott and the staff of the APTA Government Affairs Office have been more than helpful in assisting our APTSIG leadership and 34 state liaisons in communicating with our state chapters and physical therapy and veterinary boards over the past year. We're also actively working on a FAQ sheet and "action plan" for our liaisons—stay tuned!

As a result of our "appearance on the radar screen," the APTSIG was invited to present at the State Government Affairs Forum (SGAF), which was held in Albuquerque, New Mexico, September 23-25, 2007. Interestingly, other issues discussed at SGAF included chiropractic, term and practice definition and protection, and referral for profit. All of these issues are parallel issues in the practice of physical therapy on animals.

The presentation made at SGAF, overall, was very well received. Of the persons in attendance, APTSIG members from Nebraska (Kirk Peck) and Nevada (Stacey Fisher) were able to contribute to the subsequent discussion, which continued to be very positive. Ira Gorman, a delegate from the Colorado chapter who has been active in the legislative process in that state, was also able to contribute regarding his state's experience thus far in the formation of rules and regulations regarding the practice of physical therapy on animals. Finally, Steve Levine, APTA Speaker of the House, commented regarding the efforts of the APTSIG in cooperation with the APTA and Orthopaedic Section.

Obviously, our APTSIG continues to grow and our position in the Section and Association continues to evolve. The practice of physical therapy on animals, as you're aware, is not without controversy even within our own profession. Our goal continues to be open communication and collaboration within and outside of our profession for safe, effective, and evidence-based practice of physical therapy, regardless of the species.

To update the membership regarding other APTSIG efforts, we continue to focus on implementing our Strategic Plan and progressing our Practice Analysis efforts. If you haven't already, you will soon see a practice survey from the APTSIG which is essential for the successful completion of our Practice Analysis. We continue to need liaisons and committee chairs for a variety of special projects as well as nominations for the positions of President/Chair and Secretary/Treasurer. Please contact our SIG leadership for further information regarding these positions.

Remember to save the date! The next International Symposium on Animal Rehabilitation and Physical Therapy will be August 13-16, 2008 in Minneapolis, Minnesota. See www.iavrpt.com for further information!

And as always, thanks to the efforts of our liaisons and members for your continued involvement in the SIG.

ORTHOPAEDIC SECTION, FALL BOARD MEETING

Pittsburgh, PA
October 11-13, 2007

Meeting Summary

The Orthopedic Section met for 2 ½ days to review and revise their strategic plan. Topics pertinent to the Animal Special Interest Group are outlined below.

The first motion listed on the agenda pertained to the use of encumbered funds to cover CSM speakers. Since this motion has been fully funded by a sponsor, Ferno, fiscal implications are $0 and this motion was rescinded.

Clipboards were the next topic affecting the Animal SIG. Joe Godges mentioned that all retail efforts of the Section in the recent past have failed to recoup the expenses and servicing retail items cause an increased burden on the staff. He suggested looking into offering the template of the examination content of these clipboards through a vendor that could serve as the retail outlet for our members. The APTA "store," the Resource Center, may also be a good option. An idea of a paper pad that could double as an evaluation form was also discussed. These may be used at our discretion for marketing exposure and endorsement or legislative incentives for veterinarians who volunteer their time on our behalf. It was also suggested that the Orthopaedic Section or APTA logo be used and the resource center be a contact for manufacturing and distribution.

Finally, a discussion ensued regarding the name of our Animal SIG. Advice concerning the name of the SIG will be sought from APTA. Currently, Animal PT is not a normal model of practice and this term will continue to evolve as we further define our practice analysis, scientific base, and curricula. The Orthopaedic Section and APTA are in full support of our efforts. It was stated by the Orthopaedic Section Board of Directors that we are on the right track and encouraged us to stick to the primary goals: focus on our strategic plan, define our practice analysis, build our scientific base by starting a journal for evidence-based animal physical therapy, and develop a model curriculum. Rather than focusing on continuing education to define the practice of animal rehabilitation, it was suggested that the SIG continue to focus on education options that may be incorporated into an animal science undergraduate or graduate program, collaborating with veterinarians.

Respectfully submitted,
Caroline Adamson Adrian

UNDERWATER TREADMILL (UWT) THERAPY IN DOGS:

Finding the Evidence to Create a Protocol for its Use
A Small-scale Sample Literature Review

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INTRODUCTION

Hydrotherapy, in the form of swimming or underwater treadmill walking, has become increasingly popular in animal rehabilitation. Very little literature exists on the subject of hydrotherapy protocols for dogs and anecdotal recommendations are widely propagated in the industry. Where can a practitioner find the information that would be helpful in making an informed decision on what parameters would be appropriate for use with this modality as it pertains specifically to dogs? Is there enough evidence to make specific recommendations for its use?

METHODS

Three English-language textbooks on animal physiotherapy possess chapters on aquatic therapy/hydrotherapy were reviewed. Two were well referenced.[1,2] One was not referenced at all and hence the information contained within should be considered as opinion.[3] The symposium proceedings from the 1st to 4th International Symposia on Rehabilitation and Physical Therapy in Veterinary Medicine and the Royal Veterinary College 2nd and 3rd Annual Veterinary Physiotherapy Conference were reviewed. This search yielded 12 studies. On further examination of these studies, only 5 provided data that would be useful in selecting appropriate parameters for use of this therapy.[4-8] A Pubmed search was conducted using the terms dog or canine and hydrotherapy or underwater treadmill, or water, water walking, or water exercise (http://www.ncbi.nlm.nih.gov/sites/entrez). This resulted in only 2 applicable abstracts.[9,10] A Google Scholar search identified 3 additional studies, 2 of which were useable for this purpose.[11,12] The International Veterinary Information Service website (www.ivis.org) allowed free access to abstracts from veterinary conference proceedings and selected books. None of the conference proceedings were original research but one book chapter did provide a small amount of information on hydrotherapy and procedural recommendations.[13] Reviewing the reference list from the 2 referenced textbooks, produced only 2 additional canine-specific papers.[14,15] (Note: all papers were obtained via this authors access to 2 university library websites.) A review of the human literature was limited to that presented in the 2 well-referenced textbooks.

RESULTS

Scientific studies pertaining to water parameters in the UWT

Jackson et al[4]

- Joint flexion was greatest when the water is filled at or higher than the joint of interest (pertaining to the hip, stifle, shoulder, and elbow). The flexion obtained was comparable to flexion ranges achieved during swimming.
- With water height at the greater trochanter, end stage propulsion (extension in the hip, stifle and shoulder) was reduced.
- Full active joint extension of the hip, stifle, and hock was achieved during full limb cycles when compared to walking on land at the levels of the lateral malleolus and stifle.

Tragauer et al[8]

- Land weight bearing ratio of front legs: hind legs was 64:36. This same ratio was maintained with water heights at the lateral malleolus and lateral femoral condyle at the stifle. However, the ratio changed to 71:29 with water at the height of the greater trochanter.
- Table 1 describes the percentage of land weight resultant from partial water immersion at varying depths in the dog.

Table 1. Percentage of Body Weight on Land During Partial Immersion at Various Water Depths in Dogs

Water Height	% of Land Body Weight
Lateral malleolus	91%
Lateral femoral condyle	85%
Greater trochanter	38%

Dunning et al 2004[5]

- There was no significant difference in heart rate, respiratory rate, rectal temperature, and perceived exertion score in dogs exercising for 10 minutes in an underwater treadmill at temperatures of 30, 31.1, 32.2, 33.3, 34.4° C.

PARAMETERS USED OR SUGGESTED FOR CANINE WATER EXERCISE

A compilation of scientific papers was attempted and results are contained within Table 2. Very few studies looked at underwater treadmill specifically, and so 2 studies that used swimming were also included. Many studies did not report all variables. Anecdotal recommendations for hydrotherapy exercising are recorded in Table 3.

Variables for Water Exercising from Human Literature

Exercise prescriptions for water-work may not be as clear as one would expect and cannot be transferred directly from land. Energy expenditure in water may be increased when exercising in cold water due to shivering which occurs in humans at temperatures of 28 - 34°C.[16] Evans[17] found that 1/2 to 1/3 of the speed was needed to walk or jog across a pool in waist deep water at 31°C to achieve the same energy expenditure as walking or jogging on a dry treadmill. Monitoring of heart rate may yield invalid conclusions, as it has been shown to be lower by approximately 10 beats per minute with strenuous exercise in water.[17,18] This same phenomena was observed in dogs walking in water as compared to land treadmills at the same velocity and length of time.[2] Resting heart rate is also affected in water. Resting heart rates in humans are lower in water but were increased with temperature increases to 36°C as compared to 28°C.[19,20] Optimal water temperatures for exercising for humans is reported between 28 - 30°C.[21]

Table 2. Parameters Used for Aquatic Exercise Studies in Dogs

Study	Condition for which water therapy was choosen	When started on water therapy	Type of exercise	Water height	Water temp.	Exercise time	Frequency
Marsolais et al[15]	Postoperative cruciate repair	3 weeks post-op	Swimming	N/A	32.3 – 33.3°C	10 – 20 mins	2x/day 5days/wk
Hamilton[7]	Osteoarthritis	Immediately upon referral	UWT walking	Not reported	Not reported	Up to 40 mins	2x/day 2 - 3days / wk
Marsolais et al[12]	Postoperative cruciate repair	3 weeks post-op	Swimming	N/A	32.2 – 33.3°C	10 – 20 mins	2x/day 5days/wk
Gandini et al[9]	Fibrocartilaginous embolus	As soon as possible	UWT	Not reported	Not reported	10 minutes	2x/day
Hudson et al[6]	Osteoarthritis	Immediately upon referral	UWT walking	Greater trochanter	94°F (appx 34 °C)	2 x 3mins with 10 mins of standing in water btwn sessions	2days/wk
Monk et al[11]	Post operative cruciate repair	After suture removal day 10 post op	UWT walking	Greater trochanter	32 °C	Wk 2 -3x3min Wk 3 – 2x5min Wk 4 - 2x7min Wk 5 - 1x15min Wk 6 - 1x20min	1x/day

Table 3. Anecdotal Recommendation from Literature Sources for Aquatic Exercising in Dogs

Source	Type of exercise	Water parameters	Exercise time / frequency
Tangner[14]	Swimming	Warm water	10 – 20 mins, 2 x / day
Millis et al[10]	Swimming	Not reported	Start 1 – 3 mins, 1x / day 3 – 7 days / week
Steiss[13]	Swimming or UWT	Tissue relaxation at 95 °F (36 °C) Lower temp for swimming or exercise	5 – 10 mins Only a few minutes if animal is deconditioned or debilitated
Bockstahler[3]	UWT	25 – 35 °C	Start 3 x 2 mins Increase by 10% weekly 2 – 3 days / week Adjust according to fitness levels Include warm up and cool down for 2 mins each either in or out of the water

DISCUSSION AND CONCLUSION

Literature is lacking in the area of water exercising and therapy in canine literature. Within the existing literature, huge variability exists as to hydrotherapy parameters and recommendations. (Note: without library access to the full texts of the specific journal articles, even the above literature recommendations would not be obtainable. Clinicians would have difficulty making informed recommendations without this access.) To further the knowledge-base within this area of practice, it would be interesting to survey a wide base of practitioners that use swimming or UWT therapy currently with their canine rehabilitation practices to determine individually-acceptable parameters. Additionally, controlled studies that evaluate the effectiveness of different hydrotherapy parameters are needed to make evidence-based decisions on its usage.

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